OFFICE OF THE PRESIDENT

May 14, 2021

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

Dear Dr. Fielder:

Montgomery College respectfully requests approval of the following academic program action:

Creation of the digital media and web technology associate of arts, HEGIS 5008.01, CIP 10.0299, effective fall 2021.

Montgomery College is prepared to offer the new digital media and web technology associate of arts. From front-end development to server-side programming and databases, this program provides students with the skills and knowledge needed to excel in the rapidly growing field of website and web application development. Students will gain hands-on experience in HTML, CSS, and JavaScript, as well as database and web application development using industry standard equipment and software. The pathway exposes students to important website development, user interaction design, and web coursework while incorporating key General Education courses needed for transfer. The program also prepares students for transfer to a four-year institution as well as a variety of entry- and mid-level positions such as user-interface developers, web developers, digital media specialists, web designers, and multimedia specialists in the computer programming and web development professions. Students can complete the required coursework in both an on-campus and online format.

The new digital media and web technology associate of arts replaces the existing digital media and web technology associate of applied science. Upon approval of the new program, the associate of applied science will be suspended up to three years for students to complete the program or change their major to the new associate of arts. The new associate of arts will be implemented with existing institutional resources from the former program.

The new associate of arts aligns directly with Montgomery College's articulation agreement with the digital media and web technology program at University of Maryland Global Campus. Moving the existing associate of applied science to an associate of arts will facilitate growth in articulations with other academic institutions.

The associated fee of $850 for a new academic program will be sent to the Maryland Higher Education Commission via U.S. mail.

Thank you in advance for your time and consideration of this request. Feel free to contact Dr. Carolyn Terry at carolyn.terry@montgomerycollege.edu or 240-567-4226 if you have questions.

Sincerely,

DeRionne P. Pollard, Ph.D.
President

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

Institution Submitting Proposal	Montgomery College

Each action below requires a separate proposal and cover sheet.

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

Payment Submitted: (•) Yes ( ) No Payment Type: ( ) R*STARS # (•) Check # Payment Amount: $850 Date Submitted: 5/14/2021

Department Proposing Program	Academic Affairs	
Degree Level and Degree Type	Associate of Arts	
Title of Proposed Program	Digital Media and Web Technology	
Total Number of Credits	60	
Suggested Codes	HEGIS: 5008.01	CIP: 10.0299
Program Modality	( ) On-campus X Both (•) Distance Education (*fully online*)	
Program Resources	(•) Using Existing Resources ( ) Requiring New Resources	
Projected Implementation Date	(•) Fall ( ) Spring ( ) Summer	Year: 2021
Provide Link to Most Recent Academic Catalog	URL: montgomerycollege.edu/catalog	
Preferred Contact for this Proposal	Name: Ms. Betsy Leonard	
	Title: Planning & Support Specialist	
	Phone: (301) 807-7857	
	Email: betsy.leonard@montgomerycollege.edu	
President/Chief Executive	Type Name: Dr. DeRionne P. Pollard	
	Signature: DeRionne P. Pollard	Date: 05/14/2021
	Date of Approval/Endorsement by Governing Board:	01/27/2021

Revised 1/2021

Montgomery College
Digital Media and Web Technology Associate of Arts

A. Centrality to Institutional Mission and Planning Priorities:

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

Montgomery College is prepared to offer the new digital media and web technology associate of arts. From front-end development to server-side programming and databases, this program provides students with the skills and knowledge needed to excel in the rapidly growing field of website and web application development. Students will gain hands-on experience in HTML, CSS, and JavaScript, as well as database and web application development using industry standard equipment and software. The pathway exposes students to important website development, user interaction design, and web coursework while incorporating key General Education courses needed for transfer. The program also prepares students for transfer to a four-year institution as well as a variety of entry- and mid-level positions such as user-interface developers, web developers, digital media specialists, web designers, and multimedia specialists in the computer programming and web development professions. Students can complete the required coursework in both an on-campus and online format.

The new program aligns directly with Montgomery College's articulation agreement with the digital media and web technology program at University of Maryland Global Campus (Appendix A). Moving the existing associate of applied science to an associate of arts will facilitate growth in articulations with other academic institutions.

The new digital media and web technology associate of arts replaces the existing digital media and web technology associate of applied science. Upon approval of the new program, the associate of applied science will be suspended up to three years for students to complete the program or change their major to the new associate of arts. The new associate of arts will be implemented with existing institutional resources from the former program.

The new digital media and web technology associate of arts supports Montgomery College's mission, which is to empower our students to change their lives, enrich the life of the community, and hold ourselves accountable for their academic success. The program provides students hand-on experience and opportunities for career pathways in the area of web development, and students will gain academic competency in user interaction, web programming and design, and web application development. These opportunities can be life-changing for our students. Montgomery College is serving the needs of our community by providing an educated workforce to help meet the diverse needs of our citizens and community. Finally, the digital media and web technology program holds itself accountable through curriculum and workforce alignment, program assessment, faculty evaluations, and student feedback through evaluations.

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

The *2017-2021 Maryland State Plan for Postsecondary Education* states the goals of access, success, and innovation to support student success with less debt. Montgomery College echoes these goals in the *MC2025 Strategic Plan,* specifically Goal III: Fuel the Economy and Drive Economic Mobility, which encourages curriculum alignment to expand economic opportunity for our students and all county residents and businesses. Additionally, Montgomery College's *2016–2021 Academic Master Plan*, Initiative 5 - Enhance Student Pathways from MCPS to USG, strongly encourages collaborative degree pathways to enhance transferability to USG's Shady Grove campus.

Montgomery College has an active articulation agreement with the online digital media and web technology program at University of Maryland Global Campus (Appendix A). The new associate of arts

provides transferring students a pathway for completing the required coursework for successful transfer. Access to program coursework is available through in-person and online course offerings. Student success is enhanced through the availability of open educational resources, z-course options, on-campus career recruitment events, community partnerships to encourage internship opportunities, and individual advising for students. The goal of the new program is to provide students a seamless transition to a bachelor program while providing exposure to web development coursework and career and internship opportunities early in the academic program.

Moving Montgomery College's program to an associates of arts will also facilitate growth in articulations with other academic institutions, such as University of Maryland's Shady Grove bachelor of science in information science, University of Baltimore's bachelor of arts in digital communication and bachelor of science in applied information technology, and University of Maryland Global Campus, Shady Grove's bachelor of science in information systems management and bachelor of arts in communication studies.

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

The digital media and web technology associate of arts will be implemented with existing institutional resources from the digital media and web technology associate of applied science program; no additional resources are needed.

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

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

This program is intended for transfer to an equivalent bachelor of arts program at a four-year institution such as the University of Maryland Global Campus. Three dedicated faculty positions (full-time and part-time) currently support the digital media program. Outstanding faculty, state-of-the-art facilities, equipment, and library resources are already in place as the courses are currently being offered.

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

Montgomery College is committed to providing all students an opportunity to complete their program of study. Students may elect to graduate from a curriculum by meeting the curriculum requirements as outlined in any catalog in effect during their enrollment, provided they graduate within seven years of the chosen catalog. Since courses and programs may be discontinued at the discretion of the College without prior notice, the College and administering academic department will provide all students affected by such decisions with assistance in choosing appropriate courses and programs for completion.

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

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

a) The need for the advancement and evolution of knowledge

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

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

The digital media and web technology associate of arts is designed for students planning to transfer to a four-year institution to complete a bachelor's degree in areas such as data science, human-computer

interaction, database administration, user interaction and experience design, computer and information systems management, information architecture, and digital media and communications studies. Both nationally and locally, there is an ever growing need to meet the demand for digital communication professionals.

According to the United States Department of Labor's May 2019 *Occupational Outlook Handbook*, jobs for web development professionals are expected to increase by 8 percent from 2019-2029 nationally (much faster than average) and increase by 7 percent for our local metro area (much faster than average). Further, according to data from the United States Bureau of Labor Statistic's *Occupational Employment and Wages report* from May 2020, the DC/VA-MD-WV metropolitan area ranks fourth as the highest employment level for web developers and digital interface designers, and the District of Columbia ranks as the second highest concentration of jobs in the United States.

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

The *2017–2021 Maryland State Plan for Postsecondary Education* lists several strategies to meet the goals of access, success, and innovation to support student success with less debt. Following are several Montgomery College initiatives in support of those goals:

Strategy 1: Continue to improve college readiness among K-12 students, particularly high school students. Montgomery College partners with Montgomery County Students Information Technology Foundation (ITF) to encourage the sharing of information, resources, and innovation amongst the faculty and professional agencies represented on the committee. Long standing articulation agreements between Montgomery County Public Schools and Montgomery College for two program foundation courses exist to facilitate students earning college credit for their prior learning (TECH 272 Website Development and TECH 273 Advanced Website Development). A copy of the articulation is attached in Appendix B. Additionally, both foundation courses have a credit by exam option to further facilitate awarding credit for prior learning for these courses.

Strategy 4: Continue to ensure equal educational opportunities for all Marylanders by supporting all postsecondary institutions. To ensure equal educational opportunities for all Marylanders, Montgomery College's digital media, gaming, and animation programs provide free online tutoring for all students.

Strategy 6: Improve the student experience by providing better options and services that are designed to facilitate prompt completion of degree requirements. To improve the student experience by providing better options and services that are designed to facilitate prompt completion of degree requirements, the digital media and web technology associate of arts provides a clearly defined pathway for students entering the program, increased faculty access to students through targeted advising, online classes, and courses in a compressed seven-week format. The primary goal is to improve student completion and increase transfer under this designated pathway.

Strategy 8: Develop new partnerships between colleges and businesses to support workforce development and improve workforce readiness. To develop new partnerships between colleges and businesses to improve workforce readiness, Montgomery College subscribes to Career Coach, a free service for students to build a resume and research labor market data at the program level. The College also employs two full-time career coaches that establish and promote STEM-related internships, jobs, and scholarship opportunities. These opportunities are shared with digital media students through class discussion boards and a centralized Facebook discussion board for current as well as past Montgomery College information technology students.

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

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

   The educational requirements for web and web application developers are typically an associate's or bachelor's degree. Some places of employment only require a high school diploma or GED, while others require a bachelor's degree. Completion of the digital media and web technology associate of arts provides the minimum college credits and curricula required to apply to most entry-level positions. The program also provides greater flexibility to students planning to transfer to a four-year institution.

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

   According to Appendix C, EMSI Program Overview: Web Page, Digital/Multimedia and Information Resources, local Maryland, Washington, DC, and northern Virginia areas are expected to add an additional 573 web developer-related jobs during the next four years, for an overall increase of 7 percent. By 2024, it is anticipated there will be approximately 8,983 web developer positions in the Maryland, Washington, DC, and northern Virginia region. The local salary range for web developer positions is currently above the national median salary range at a rate of $37.84 per hour.

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

   Appendix C, EMSI Program Overview: Web Page, Digital/Multimedia and Information Resources, shows projected employment data for the digital media and web technology industry.

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

   The following table reflects the projected number of graduates for the new digital media and web technology associate of arts. The data are extrapolated from a combination of students currently registered in Montgomery College's associate of arts in computer science, data science, and computer gaming and simulation.

	Year 1	Year 2	Year 3	Year 4	Year 5
Projected Graduates	15	18	21	24	27

D. Reasonableness of Program Duplication:

1. **Identify similar programs in the state and/or same geographical area. Discuss similarities and differences between the proposed program and others in the same degree to be awarded.**

   There are several related programs offered in the state of Maryland:

   - Anne Arundel Community College offers an associate of applied science in internet and mobile device application development that focuses on designing and programming interactive apps either for the Internet or devices like smartphones and tablets.
   - Prince George's Community College offers an associate of arts in general studies with an area of concentration in mass communication that prepares students for career positions in film, television, video, radio, and other digital and mass media industries.
   - Harford Community College offers an associate of applied science in mass communication that emphasizes a multimedia approach, including instruction in journalism, new media, advertising and marketing promotion.

- College of Southern Maryland offers an associate of arts in digital media production that teaches students to learn to write, produce, and direct public service announcements, talk shows, documentaries, dramatic films, audio production, and website development.
- Community College of Baltimore County offers an associate of applied science in digital media production that trains students in all aspects of pre-production, production, and post-production media formats.

The new digital media and web technology associate of arts fulfills the increased need for a transfer program in the area of web development and programming. Although comparable programs exist at other community colleges in Maryland, none have the same focus as Montgomery College's digital media and web technology AA or are close enough geographically for duplication to be a concern. Montgomery College is the only program west of I-95 providing the Washington metropolitan area an opportunity to study this field. For these reasons, program duplication is reasonable for this degree.

2. Provide justification for the proposed program.

Montgomery College currently offers an associate of applied science in digital media and web technology. The program is moving to an associate of arts to increase transferability to local four-year institutions such as University of Maryland Global Campus, University of Maryland Shady Grove Campus, University of Maryland Baltimore County, and University of Baltimore. The required courses have been pared down significantly to allow for more General Education courses needed to transfer to four-year programs.

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

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

There is no impact at Maryland's HBIs.

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

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

There is no impact at Maryland's HBIs.

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 describe the faculty who will oversee the program.

The new digital media and web technology associate of arts is designed to offer interested students a guided pathway for transfer to a four-year academic institution. The program allows students greater flexibility and course options for timely and efficient program completion, while offering the specific web development coursework needed for transfer. The creation of this program will help Montgomery College identify and establish additional articulation agreements with other four-year institutions.

Three dedicated faculty positions (full-time and part-time) currently support the digital media program. In addition to having strong academic credentials, most faculty either served, or are currently serving, as practitioners in education, database administration and programming, or user interface design and development. The department chair and dean will oversee the program.

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

Following are the program outcomes and the courses supporting those outcomes:

Outcomes	Courses
Demonstrate currency and proficiency in the digital tools employed in website and web application development.	TECH 272, TECH 273, TECH 274, TECH 276, TECH 282
Apply the techniques and knowledge of foundational skills in a range of media to create professional quality websites and web applications that comply with current web standards and are representative of the material and techniques studied.	TECH 272, TECH 273, TECH 274, TECH 276, TECH 282

3. Explain how the institution will:

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

Program learning outcomes will be assessed through final projects in each of the program's required program courses (TECH 272, TECH 273, TECH 274, TECH 276 and TECH 282).

b) document student achievement of learning outcomes in the program

There are several comprehensive and multifaceted assessment processes for all disciplines across the College. Montgomery College's Office of Assessment supports the College's mission and vision by providing leadership in the area of assessment and evaluation. This is achieved by:

- Providing leadership, guidance, and data support for the College's assessment of student learning outcomes for programs.
- Coordinating a comprehensive system of program reviews for academic areas.
- Collecting, analyzing, and distributing reports and information to the College about assessment results.
- Consulting with administrative areas, disciplines, and academic programs on assessment and evaluation projects.

Following is an overview of assessment processes at Montgomery College:

Assessment Type	Purpose	Cycle
General Education Outcomes Assessment	To examine student acquisition of General Education competencies.	Once every three years
Program Assessment	To assess student attainment of the program's student learning outcomes for the purpose of discovering what is working well and where improvements can be made to increase student learning.	Once every three years
Program Review (also referred to as the College Area Review)	To examine the current alignment and relevance of a program's curriculum and success with retaining and matriculating students.	Once every five years
Administrative Assessment	To review an administrative area's success with achieving outcomes and institutional priorities.	Once every five years

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

Program Title: Digital Media and Web Technology Associate of Arts (New Curriculum)

From front-end development to server-side programming and databases, this program provides students with the skills and knowledge needed to excel in the rapidly growing field of website and web application development. Students in this program will gain hands-on experience in HTML, CSS and JavaScript as well as database and web application development, using industry standard equipment and software. This degree prepares students for transfer to a four-year institution as well as a variety of entry and mid-level positions such as user-interface developers, web developers, digital media specialists, web designers and multimedia specialists.

Course	Title	Credits
Semester One		
ENGL 101	Introduction to College Writing *	**3**
MATF	Mathematics Foundation (MATF) †	**3**
GDES 116	Digital Tools for the Visual Arts (ARTD)	**4**
TECH 272	Website Development	**4**
Semester Two		
ENGF	English Foundation (ENGF) †	**3**
NSLD	Natural Sciences Distribution with Laboratory (NSLD) †	**4**
ARTD, HUMD, or HLTH	ARTD, HUMD, or HLTH Course (GEIR) †	**3**
TECH 276	JavaScript Fundamentals	**3**
TECH 273	Advanced Website Development	**3**
Semester Three		
HUMD	Humanities Distribution (HUMD) †	**3**
BSSD	Behavioral and Social Sciences Distribution (BSSD) ** †	**3**
TECH 274	Web Content Management Systems and Strategy	**3**
TECH 282	Web Application Development Using PHP and MySQL	**3**
Elective	Elective ††	**3**
Semester Four		
BSSD	Behavioral and Social Sciences Distribution (BSSD) ** †	**3**
NSND or NSLD	Natural Sciences Distribution without Laboratory (NSND) † or Natural Sciences Distribution with Laboratory (NSLD) †	**3**
COMM 108 or COMM 112	Foundations of Human Communication (GEIR) † or Business and Professional Speech Communication (GEIR) †	**3**
Elective	Elective ††	**3**
Elective	Elective ††	**3**
	Total Credits	**60**

* ENGL 101/ENGL 011, if needed for ENGL 102/ENGL 103, or for elective.
** Behavioral and Social Sciences Distribution (BSSD) courses must come from different disciplines.
† Recommended General Education courses for transfer include: ENGL 102 (ENGF), ENGL 103 (ENGF), MATH 117 (MATF), HIST 205 (HUMD), SOCY 100 (BSSD), PSYC 102 (BSSD), ASTR 101 (NSLD), BIOL 105 (NSND)
†† Students may select 3-credit or 4-credit electives. Students should consult a program advisor and check transferability to four-year institutions.

Program Title: Digital Media and Web Technology Associate of Applied Science (Old Curriculum)

The digital media and web technology program is designed for the student who wishes to pursue a career or to continue studies in digital media and web development. This program teaches technologies involved in designing and developing user interfaces, websites, and web applications as well as mobile and web server programming. Students may focus their studies on user interface development, web development, or mobile development or take courses from some or all of the focus areas. The curriculum prepares students for a variety of entry and midlevel positions as user-interface developers, web developers, web designers, digital media, and multimedia specialists.

Course	Title	Credits
Semester One		
ENGL 101	Introduction to College Writing *	**3**
MATF	Mathematics Foundation (MATF)	**3**
ARTT 116 or GDES 116	Digital Tools for the Visual Arts (GEEL) or Digital Tools for the Visual Arts (GEEL)	**4**
CMSC 100	Fundamentals of Computer Programming †	**2**
ARTD or HUMD	Arts or Humanities Distribution (ARTD or HUMD)	**3**
Semester Two		
ENGF	English Foundation (ENGF)	**3**
TECH 272	Website Development	**4**
BSSD	Behavioral and Social Sciences Distribution (BSSD)	**3**
Elective	Program Elective ‡	**4**
Semester Three		
TECH 273	Advanced Website Development	**3**
TECH 274	Web Content Management Systems and Strategy	**3**
TECH 276	JavaScript Fundamentals	**3**
NSLD	Natural Sciences Distribution with Laboratory (NSLD)	**4**
Elective	Program Elective ‡	3
Semester Four		
TECH 299	Web Certificate/Degree Portfolio	**3**
Elective	Program Electives ‡	**12**
	Total Credits	**60**

* ENGL 101/ENGL 101A, if needed for ENGL 102/ENGL 103, or elective.

‡ Program electives: GDES 121, GDES 140, GDES 212, GDES 214, GDES 216, CMSC 141/CMAP 242, TECH 277, TECH 278, TECH 282, TECH 288, CA 213/CMSC 201, CS 214/CMSC 214, CS 261/CMSC 234, CS 270/CMSC 246, CS 216/CMSC 250, TV110/TVRA 140. Please consult a digital media advisor before selecting courses.

† CMSC 100 is designed for students new to computer programming. Successful completion of CMSC 140 is necessary for mobile development courses.

List of Courses with Title, Semester Credit Hours, and Course Descriptions:

Designators:

- ARTD: Arts Distribution
- BSSD: Behavioral and Social Sciences Distribution
- ENGF: English Foundation
- HUMD: Humanities Distribution
- GEEL: General Education Elective
- MATF: Mathematics Foundation
- NSND: Natural Sciences without Laboratory Distribution
- NSLD: Natural Sciences with Laboratory Distribution
- GCP: Global and Cultural Perspectives Requirement
- CE: Credit by exam option
- R Only: Offered at the Rockville Campus only

ASTR 101 – Introductory Astronomy (NSLD)

A basic introduction to astronomy that emphasizes appreciation of the Earth's relationship to the universe. The basic laws of physics as they apply to astronomy are covered, along with telescopes and data collection and analysis techniques utilized by astronomers. Also covered are the evolution of stars, the solar system, galaxies, and the origin and evolution of the universe. Laboratory sessions, both computer- based and other, give practical application to material covered in lectures. Two nighttime observing sessions are also included. Assessment Level(s): ENGL 101/ENGL 011, MATH 050. Three hours lecture, two hours laboratory, one hour discussion each week.

BIOL 105 – Environmental Biology (NSND)

This course is designed for non-science majors and emphasizes environmental problems facing society. Topics include ecological principles, human population dynamics, energy sources, land and soil use, air pollution, water pollution, and endangered species. BIOL 105 will satisfy the NSND General Education requirement. A combination of BIOL 105 and BIOL 106 will satisfy the NSLD General Education requirement. Assessment Level(s): ENGL 101/ENGL 011, MATH 050, READ 120. Three hours each week.

COMM 108 - Foundations of Human Communication (GEIR)

A survey course that covers communication theory and develops communication skills for personal and professional relationships in interpersonal, group, and public settings. Course content includes practice in the application of the principles of listening, verbal and nonverbal communication, group dynamics, and public speaking. Assessment Level(s): ENGL 101/ENGL 011, READ 120. Three hours each week.

COMM 112 - Business and Professional Speech Communication (GEIR)

A study of communication theory as applied to business and organizational environments. Emphasis on development of effective communication skills for professional situations including team building, interviewing, public speaking, and accommodating diverse perspectives. Assessment Level(s): ENGL 101/ENGL 011, READ 120. Three hours each week.

ENGL 011 – Introduction to College Writing Support

A corequisite course designed to equip students with the skills needed to be successful in ENGL 101. ENGL 011 provides extended guidance and in-class practice with all stages of the writing process, with deliberate emphasis on grammar skills and critical reading and thinking. Upon successful completion, students will advance to ENGL 102 or ENGL 103 according to discipline guidelines. PREREQUISITE(S): Placement through assessment testing; or completion of IERW 001 with a grade of B or better; or completion of IERW 002 with a grade of C or better; or completion of AELW 940/ELAI 990 with a grade of C or better; or consent of the department. COREQUISITE(S): ENGL 101. ENGL 101 and ENGL 011 must be taken concurrently. Assessment Level(s): READ 120. Two hours each week.

ENGL 101 - Introduction to College Writing (CE)

An introduction to college writing. The first of two sequential freshman composition courses, this course emphasizes the process of critical thinking, reading, and writing. Student writing progresses from a personal to an academic perspective. Students write for different audiences and purposes using a variety of rhetorical strategies. Students write in response to reading and are introduced to standard documentation procedures. Students are required to submit a final portfolio that meets department requirements. PREREQUISITE(S): Placement through assessment testing; or concurrent enrollment in ENGL 011; or completion of IERW 002 with a grade of A; or completion of AELW 940/ELAI 990 with a grade of C or better; or consent of the department. Assessment Level(s): READ 120. Three hours each week.

ENGL 102 - Critical Reading, Writing, and Research (ENGF)

Studies in argumentation and research. A second of two sequential freshman composition courses, this course is designed to help students learn to identify, critically read, analyze and evaluate, and write arguments using logic and appropriate rhetorical techniques. Students construct thesis-driven academic essays, synthesizing and incorporating the words and ideas of others and using formal documentation. Students learn to identify audience as well as employ effective tone, word choice, and sentence patterns. PREREQUISITE(S): A grade of C or better in ENGL 101 or ENGL 101A or consent of department. Three hours each week.

ENGL 103 – Critical Reading, Writing, and Research in the Work Place (ENGF)

Studies in argumentation and research in the workplace. A second of two sequential freshman composition courses, this course is designed to help students understand the processes and products associated with writing used in technology and business. Emphasis will be on the writing process, including writing to different audiences and supporting claims persuasively with appropriate evidence and detail. Students will write a variety of reports, documentation, and proposals, employing a range of stylistic options. The course will include an introduction to the rules for integrating visual aids into technical documents and a major research project focusing on developing an appropriate research question, conducting scholarly research, and incorporating information into writing with the proper conventions of citation. PREREQUISITE(S): A grade of C or better in ENGL 101 or ENGL 101A or consent of department. Three hours each week.

GDES 116 - Digital Tools for the Visual Arts (ARTD)

An introduction to the digital tools used in the visual arts and the social, cultural and ethical application of those tools. Students are exposed to the theory and function of the major software packages, basic digital design principles, and collaborative processes utilized in the visual arts. Topics include operating systems, typography, vector and bitmap imaging, page layout, PDF creation and editing, timeline-based video editing, file transfer, output, web, emerging technologies, and other material relative to the digital visual arts workflow. Two hours lecture, four hours laboratory each week.

HIST 205 – Technology and Culture in the Western World (HUMD) (R only)

Focus upon selected topics in the history of technology, concentrating on the period from the Renaissance to the 20th century's "brave new world" of science, technology, and industry. Relates technological development with diverse patterns of Western culture as it evolved within this historic framework. Designed to fit the needs and interests of students in technological programs, as well as those following general education or liberal arts curricula. Assessment Level(s): ENGL 101/ENGL 011, READ 120. Three hours lecture/discussion each week.

MATH 117 – Elements of Statistics (MATF)

An introductory noncalculus statistics course to serve a variety of students who need a working knowledge of statistics. Descriptive analysis and treatment of data, probability and probability

distributions, statistical inferences, linear regression and correlations, chi-square, and some nonparametric statistics. Preexisting statistical computer programs may be used for some applications. PRE- or COREQUISITE(S): Appropriate score on mathematics assessment test, a grade of C or better in MATH 050 or MATH 092, or concurrent enrollment in MATH 017, or consent of department. Assessment Level(s): ENGL 101/ENGL 011 or AELW 940/ELAI 990, READ 120 or AELR 930/ELAR 980. Three hours each week.

PSYC 102 – General Psychology (BSSD)

Introduction to the fields and research methods of psychology, including such topics as biological bases of behavior, human development, perception, learning, mental disorder, and social behavior. Assessment Level(s): ENGL 101/ENGL 011, READ 120. Three hours each week.

SOCY 100 – Introduction to Sociology (BSSD, GCP)

An exploration of fundamental sociological concepts, methods, and theories used to interpret the patterns of human society. Emphasis is placed on the connection between theory and practice in examining social interaction, cultural diversity, social structure, and global issues. Assessment Level(s): ENGL 101/ENGL 011, READ 120. Three hours each week.

TECH 272 – Professional Website Development (CE)

Provides instruction for creating, uploading, and maintaining professional-quality websites containing graphics, style sheets, multimedia, and other basic enhancements using hand-coded HTML as well as Adobe Dreamweaver's fundamental tools. Topics include website development and emerging Internet technologies and trends. PREREQUISITE(S): Any CMAP, CMSC, GDES or TECH course that is two credits or more or consent of department. Assessment Level(s): ENGL 101/ENGL 011, READ 120. Four hours lecture/discussion each week.

TECH 273 - Advanced Professional Website Development (CE)

Explores latest advanced Web technologies and development skills with HTML, Cascading Style Sheets, Web standards, basic server-side programming, usability and accessibility, JavaScript, and Integrated Development Environment (IDE). Students make web-sites attractive, dynamic, accessible, and easy to maintain. PREREQUISITE(S): TECH 272 or successful completion of the departmental skills assessment. Three hours lecture/discussion each week.

TECH 274 - Web Content Management Systems and Strategy

An introduction to Content Management Systems (CMS) for the web with a focus on content strategy. Course topics include strategy, types of CMS, the use and customization of plug-ins and add-ons, as well as building themes and dynamic content for cross-platform delivery. Students will learn how to audit content for a website, choose an appropriate CMS, and convert a static design into a dynamic CMS-powered site. No programming experience is required, although knowledge of a modern web programming language is helpful. Knowledge of HTML and CSS is assumed. PREREQUISITE(S): TECH 272 or consent of department. Three hours each week.

TECH 276 - JavaScript Fundamentals

A study of JavaScript language used to create dynamic and interactive web content. In this introductory course, students will learn the fundamentals of working with the behavior layer of web development using JavaScript. Students will learn scripting basics. the principles of unobtrusive and cross browser scripting, how to navigate and manipulate the Document Object Model (DOM), and how to use JavaScript libraries to improve web development. PREREQUISITE(S): TECH 272 or consent of department. Three hours each week.

TECH 282 - Web Application Development Using PHP and MySQL

An introduction to the creation and maintenance of data- driven Web sites using PHP and MySQL. Create a MySQL database and maintain the database dynamically using the programming language PHP. PREREQUISITE(S): CMSC 140 or TECH 278 or consent of department. Three hours lecture/discussion each week.

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

   Each two-year plan of study includes General Education requirements, program requirements, and program electives. General Education requirements are interspersed with program requirements for each program.

   The following General Education courses are required for students to graduate with the digital media and web technology associate of arts and meet Montgomery College's institutional requirements and the external standards set forth in COMAR.

General Education Requirements	COMAR Credits	College Credits	Program Credits	Program Course
English Foundation (ENGF)	3	3	3	ENGL 102
Mathematics Foundation (MATF)	3	3	3	MATH 117
Arts Distribution (ARTD)	3	3	3	GDES 116
Humanities Distribution (HUMD)	3	3	3	Elective (HIST 205)
Communications, Health, or Arts or Humanities Distribution (GEIR)	3	6	6	COMM 108 or COMM 112 and Elective
Behavioral and Social Sciences Distribution (BSSD)	6	6	6	Elective (SOCY 100 and PSYC 102)
Natural Sciences Distribution with Lab (NSLD)	4	4	4	Elective (ASTR 101)
Natural Sciences Distribution without Lab (NSND)	3	3	3	Elective (BIOL 105)
Total	**28**	**31**	**31**	

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

   Not applicable.

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

   There are no written contracts with other institutions or non-collegiate organizations for this program.

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.**

Montgomery College's online catalog helps students quickly locate and save details about the current schedule of classes, courses, and programs. The catalog is dynamic, meaning a live document that reflects changes in real time. The online catalog is located on the official policies page of the College's website at montgomerycollege.edu/catalog.

To determine program-specific information, students can view the program advising guide aligned with any program in the catalog. These guides directly link to the catalog so they reflect real-time information. The program advising guides are meant to supplement the advising process and should be used in conjunction with the Montgomery College catalog and other College resources.

Students may find general information such as availability of academic support services, financial aid resources, tuition rates, and payment policies by using the search function at montgomerycollege.edu.

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.

If approved, the new digital media and web technology associate of arts will be published in Montgomery College's online catalog. The Office of the Senior Vice President for Academic Affairs oversees publication and maintenance of the online catalog.

Advertising and recruitment for the digital media and web technology associate of arts will occur at College events such as new student orientation, major-specific fairs, guest speaker series, symposia, college recruitment fairs, and networking opportunities from outside agencies and organizations. The Office of Communications oversees publication of electronic and hard copy marketing materials.

H. Adequacy of Articulation

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

The new digital media and web technology associate of arts aligns directly with Montgomery College's articulation agreement with the digital media and web technology program at University of Maryland Global Campus (Appendix A). Moving the existing associate of applied science to an associate of arts will facilitate growth in articulations with other academic institutions.

I. Adequacy of Faculty Resources (as outlined in COMAR 13B.02.03.11).

1. Provide a brief narrative demonstrating the quality of program faculty. Include a summary list of faculty with appointment type, terminal degree title and field, academic title/rank, status (full-time, part-time, adjunct) and the course(s) each faculty member will teach (in this program).

Montgomery College appoints faculty that are experienced educators and working professionals in the fields of programming, STEM education, and graphic design. The current faculty continue to engage in professional development opportunities and community partnerships in the region to improve curriculum development and design. Furthermore, because of the College's close proximity to the Washington, DC, metropolitan area, numerous active digital media and web technology professionals serve as part-time faculty as well as guest speakers.

Following is a list of faculty with terminal degree title and field, academic title/rank, and the course(s) each faculty member will teach:

Name	Terminal Degree	Academic Title	Courses Taught
Melissa B Lizmi	M.A. Economics	FT Faculty	TECH 272, TECH 273, TECH 274, TECH 276, TECH 282
Harry St. Ours	M.F.A.	FT Faculty	GDES 116
John Carmody	B.A. American History	PT Faculty	TECH 272, TECH 273, TECH 274, TECH 276, TECH 299
Yvonne Williams	M.A. Adult Education and Distant Learning	PT Faculty	TECH 272, TECH 273, TECH 274, TECH 276

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

a) Pedagogy that meets the needs of the students

Montgomery College offers numerous in-person and online course offerings for best practices in pedagogy, content delivery, and course assessment. The College also offers an educational assistance program (EAP) that provides faculty funds to support graduate and doctoral coursework and professional conferences and workshops.

Digital media and web technology faculty maintain active memberships in professional organizations related to the discipline. Faculty attend conferences, workshops, and continuing education programs through internal and external training.

b) The learning management system

Montgomery College's E-Learning, Innovation, and Teaching Excellence (ELITE) department offers many online and in-person training sessions for the College's learning management system (Blackboard), as well as Quality Matters training and semester-long training to prepare faculty for distance education courses. In summer 2020, all full and part-time faculty were instructed in the best practices for implementing structured remote instruction through the learning management system. Faculty are also encouraged to use the learning management system to help support their in-person courses.

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

ELITE offers numerous training opportunities in distance education pedagogy and instructional technology. A team of instructional designers works closely with individual faculty, academic departments, and committees to design and deliver faculty professional development. In addition, all online instructional faculty are required to complete Blackboard training prior to teaching in the online setting.

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.

Library resources are adequate to support the program and all proposed courses for the new digital media and web technology associate of arts. Students have ready access to current and relevant books, journals, and reference materials needed to meet the requirements of the curriculum.

In addition to its robust online presence, the Montgomery College Library has three physical locations with comfortable facilities that are conducive to academic work. In-person library services are available 73 hours per week. The library supports the academic goals of the College's students and employees

through group instruction sessions, personal research consultations, and online support. Technology available in the library includes computers, printers, charging stations, high-speed scanners, laptops, tablets, One Button Studios for easy video creation, and collaborative workstations for group projects. Web-delivered subscription databases cover many academic disciplines, including digital media and web technology.

K. Adequacy of Physical Facilities, Infrastructure and Instructional Equipment (as outlined in COMAR 13B.02.03.13)

1. Provide an assurance that physical facilities, infrastructure and instruction equipment are adequate to initiate the program, particularly as related to spaces for classrooms, staff and faculty offices, and laboratories for studies in the technologies and sciences.

The digital media and web technology associate of arts will be implemented with existing institutional resources from the existing digital media and web technology associate of applied science. The associate of applied science will be suspended upon approval of the new program.

Physical facilities and equipment are adequate to support the digital media and web technology associate of arts as Montgomery College currently offers all courses in the program.

2. Provide assurance and any appropriate evidence that the institution will ensure students enrolled in and faculty teaching in distance education will have adequate access to:

a) An institutional electronic mailing system, and

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

Upon admission, every student receives a Montgomery College email account; this is the primary method for receiving correspondence and information from various College offices and departments. The College utilizes Blackboard as its learning management system. Additionally, Montgomery College promotes distance learning by providing access to online counseling, advising, library resources, tutoring, and more.

Students enrolled in the digital media and web technology associate of arts can complete all required courses in an on-campus or online setting.

L. Adequacy of Financial Resources with Documentation (as outlined in COMAR 13B.02.03.14)

1. Complete Table 1: Resources and Narrative Rationale. Provide finance data for the first five years of program implementation. Enter figures into each cell and provide a total for each year. Also provide a narrative rationale for each resource category. If resources have been or will be reallocated to support the proposed program, briefly discuss the sources of those funds.

TABLE 1: PROGRAM RESOURCES

1. Reallocated Funds:

- Reallocated funds include faculty, administrator, and support staff salaries currently supporting the digital media and web technology associate of applied science. The same positions will support the new associate of arts.

2. Tuition and Fee Revenue:

- The credit hour rate is based on 2020 in-county tuition and includes both tuition and fees. The first credit hour is $201 ($132 plus minimum $50 consolidated fee and other fees); the rate is $177. 40 for two or more hours.
- Full-time enrollment is equivalent to 30 credit hours for the academic year; part-time enrollment is equivalent to 15 credit hours for the academic year.

3. **Grants and Contracts:**
   - No grants or external funding is needed to implement this program.
4. **Other Sources:**
   - No additional funds are needed to implement this program.
5. **Total Year:**
   - Program resources reflect a conservative projection of full-time and part-time student enrollment over five years.

Table 1: Program Resources					
Resource Categories	**Year 1 (2021-22)**	**Year 2 (2022-23)**	**Year 3 (2023-24)**	**Year 4 (2024-25)**	**Year 5 (2025-26)**
1. Reallocated Funds	$164,279	$168,455	$172,749	$177,163	$197,904
2. Tuition/Fee Revenue (c + g below)	$79,830	$114,786	$165,495	$215,775	$277,206
a. Number of F/T Students	8	12	19	24	30
b. Annual Tuition/Fee Rate	$5,322	$5,466	$5,610	$5,754	$5,898
c. Total F/T Revenue (a x b)	$42,576	$65,592	$106,590	$138,096	$176,940
d. Number of P/T Students	14	18	21	27	34
e. Credit Hour Rate	$177.40	$182.20	$187.00	$191.80	$196.60
f. Annual Credit Hour Rate	15	15	15	15	15
g. Total P/T Revenue (d x e x f)	$37,254	$49,194	$58,905	$77,679	$100,266
3. Grants, Contracts & Other External Sources	$0	$0	$0	$0	$0
4. Other Sources	$0	$0	$0	$0	$0
TOTAL (Add 1 – 4)	$244,109	$283,241	$338,244	$392,938	$475,110

2. **Complete Table 2: Program Expenditures and Narrative Rationale. Provide finance data for the first five years of program implementation. Enter figures into each cell and provide a total for each year. Also provide a narrative rationale for each expenditure category.**

TABLE 2: PROGRAM EXPENDITURES

1. **Faculty (# FTE, Salary, and Benefits):**
   - The faculty below currently support the digital media and web technology associate of applied science. The same faculty will support the new associate of arts. Part-time faculty are hired as needed per semester.
   - Faculty salaries are based on an annual increase of 2.75 percent.
   - Benefits include 7.65 percent for FICA and $9,000 per FTE for insurance.

Name	Appointment/Status	Program Time
Melissa Lizmi	Full-time Professor	100%
Harry St. Ours	Full-time Professor	20%
John Carmody	Part-Time Faculty	10%
Yvonne Williams	Part-Time Faculty	10%

2. **Administrative Staff (# FTE, Salary, and Benefits):**

   - The administrators below currently support the digital media and web technology associate of applied science. The same administrators will support the new associate of arts.
   - Administrative staff salaries are based on an annual increase of 3 percent.
   - Benefits include 7.65 percent for FICA and $9,000 per FTE for insurance.

Name	Appointment/Status	Program Time
Erik Swanson	Department Chair	10%
Frank Trezza	Dean	5%

3. **Support Staff (# FTE, Salary, and Benefits):**

   - The support staff below currently support the digital media and web technology associate of applied science. The same staff will support the new associate of arts.
   - Support staff salaries are based on an annual increase of 3 percent.
   - Benefits include 7.65 percent for FICA and $9,000 per FTE for insurance.

Name	Appointment/Status	Program Time
Sam Aung	Administrative Aide II	10%

4. **Equipment:**

   - No additional equipment is needed to implement this program.

5. **Library:**

   - No additional library resources are needed to implement this program.

6. **New and/or Renovated Space:**

   - No additional facilities are needed to implement this program.

7. **Other Expenses:**

   - No other expenses are anticipated to implement this program.

8. **Total Year:**

   - Expenditures include faculty, administrator, and support staff salaries currently supporting the digital media and web technology associate of applied science. The same positions will support the new associate of arts.

Table 2: Program Expenditures					
Expenditure Categories	**Year 1 (2021-22)**	**Year 2 (2022-23)**	**Year 3 (2023-24)**	**Year 4 (2024-25)**	**Year 5 (2025-26)**
1. Faculty (b + c below)	$135,083	$138,451	$141,912	$145,468	$149,122
a. Number of FTE	1.40	1.40	1.40	1.40	1.40
b. Total Salary	$113,779	$116,908	$120,122	$123,426	$126,820
c. Total Benefits	$21,304	$21,543	$21,789	$22,042	$22,302
2. Admin. Staff (b + c below)	$22,297	$22,925	$23,573	$24,239	$24,926
a. Number of FTE	0.15	0.15	0.15	0.15	0.15
b. Total Salary	$19,458	$20,042	$20,643	$21,263	$21,901
c. Total Benefits	$2,839	$2,883	$2,929	$2,977	$3,025
3. Support Staff (b + c below)	$6,899	$7,079	$7,264	$7,455	$7,652
a. Number of FTE	0.10	0.10	0.10	0.10	0.10
b. Total Salary	$5,573	$5,740	$5,912	$6,090	$6,272
c. Total Benefits	$1,326	$1,339	$1,352	$1,366	$1,380
4. Technical Support and Equipment	$0	$0	$0	$0	$8,552
5. Library	$0	$0	$0	$0	$7,652
6. New or Renovated Space	$0	$0	$0	$0	$0
7. Other Expenses	$0	$0	$0	$0	$0
TOTAL (Add 1 – 7)	$164,279	$168,455	$172,749	$177,163	$197,904

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 College assesses and reviews programs on a regular basis based on the information noted in section G.3. All courses and programs at Montgomery College have clearly stated learning outcomes. The program learning outcomes align with and support the student learning outcomes of the individual courses that form a degree's curriculum. The program assessment process involves assessment planning, data collection, review of results, action plan development and implementation, and reassessment. The cyclical loop is closed by using the assessment results to improve teaching and learning experiences.

College faculty undergo an extensive and comprehensive evaluation process in compliance with the agreements between the College and the Montgomery College Chapter of American Association of University Professors (full-time faculty) and the Service Employees International Union (part-time faculty). This process includes student evaluations, self-evaluations, peer reviews, classroom observations, department chair reviews, and dean evaluations. The evaluation schedule varies from annually to every five years, depending on the faculty contract type and contract year. Evaluations determine if faculty members demonstrate high-quality performance in their teaching assignments, seek professional growth in their teaching area, are available to students, meet special objectives from preceding evaluations, and demonstrate substantial progress in service to their campus, the College, and/or the community. The purpose of a performance review is to promote the highest quality teaching techniques, to ensure knowledge of subject matter, to encourage professional growth and development of faculty, to assess strengths and weaknesses in faculty performance, and to assess service to the College community.

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.

All programs at Montgomery College go through an academic program review every five years to determine program viability. The academic program review ensures all programs support the College's mission, effectively use the College's instructional resources, and serve the needs of students and the

College community. The new digital media and web technology associate of arts will go through the academic program review process as all other programs at Montgomery College.

Montgomery College is proud to be selected as an Achieving the Dream (ATD) institution. ATD is a nationwide network of higher education institutions committed to systemic change to increase student success and completion, especially among disadvantaged students. As an ATD institution, Montgomery College works to build a culture of evidence that uses data to make informed decisions for student success. One example of the College's use of data is the Student Success Score Card, which is a summary of indicators used to track student achievement.

The academic program review process and the Student Success Score Card provide actionable information to help the College assess and improve its focus on achievement and the success of every student.

N. Consistency with the State's Minority Student Achievement Goals (as outlined in COMAR 13B.02.03.05).

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

Montgomery College is committed to creating a welcoming and inclusive environment for all students. As a whole, the Montgomery College community promotes an equity and inclusion focus where radical inclusion—or deeply rooted values of welcoming all individuals seeking higher education or continuing education—are an essential element of the College's fabric. The College's steadfast commitment to radical inclusion creates an inclusive, respectful learning environment that fosters critical thinking and civil discourse.

The digital media and web technology program is committed to serving Montgomery College's diverse student body and promoting equity and inclusion by: (1) increasing the recruitment of women and minority students to promote diversity in the student body and web development professions as a whole, and (2) providing a curriculum designed to promote student success, retention, completion, and access to career opportunities.

O. Relationship to Low Productivity Programs Identified by the Commission:

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

Not applicable. This program is not related to low-productivity programs identified by the Maryland Higher Education Commission.

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

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

Montgomery College is eligible to provide distance education programs. The College currently offers numerous online programs and a variety of online and blended courses.

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

The Middle States Commission on Higher Education is the accrediting body for Montgomery College. The College received a positive outcome at the last reaccreditation in 2018.

Appendix A - Montgomery College's Articulation Agreement with the Digital Media and Web Technology Program at University of Maryland Global Campus

MONTGOMERY COLLEGE ASSOCIATE OF APPLIED SCIENCE: DIGITAL MEDIA & WEB TECHNOLOGY

Students transferring from Montgomery College with a conferred Associate of Arts or Associate of Science degree will have the GER (General Education Requirement) block of courses met at UMGC (A.A.S. degrees not included). Please see community college advisor for course sequencing.

UNIVERSITY OF MARYLAND GLOBAL CAMPUS — **CATALOG YEAR: 2020-2021**

UMGC BACHELOR OF SCIENCE: DIGITAL MEDIA & WEB TECHNOLOGY WEB DESIGN TRACK

http://www.umgc.edu/transfers-and-credits/community-college-alliances/maryland-community-college-alliances.cfm

CREDITS	MONTGOMERY COLLEGE Requirements for Associate Degree	CREDITS	UNIVERSITY OF MARYLAND GLOBAL CAMPUS Requirements for Bachelor's Degree
3	✓ ENGL 101 (English foundation)		WRTG elective (Gen Ed Communications)
3	✓ MATH 165 (recom'd Math foundation course)		MATH 115 (Gen Ed Math course)
4	✓ ARTS 116 or GDES 116 (Gen Ed Elective)		GRCO 100 (Gen Ed Arts & Humanities)
2	✓ CMSC 100 (required program course)		CMIS elective
3	✓ Arts & Humanities distribution		Gen Ed Arts & Humanities
3	✓ ENGL 102 (recom'd English foundation)		WRTG 112 (*Must be completed with a grade of C- or better*)
4	✓ TECH 272 (required program course)		◆ CMST 385* (required for the major)
3	✓ Behavioral & social science distribution		Gen Ed Behavioral / Social Science
4	✓ Program elective		Program elective
3	✓ TECH 273 (required program course)		◆ CMST 386* (required for the major)
3	✓ TECH 274 (required program course)		CMST elective
3	✓ TECH 276 (required program course)		◆ CMST 388* (required for the major)
4	✓ Natural science distribution with lab		Gen Ed Biological / Physical Science w/lab
3	✓ Program elective		Program elective
3	✓ TECH 299 (required program course)		CMST elective
3	✓ TECH 277 (recom'd program elective)		◆ CMST 488* (required for the major)
9	✓ Program elective		Elective
60	**Total Credits Transferred**		

REMAINING UMGC DEGREE REQUIREMENT RECOMMENDED SEQUENCE UPON TRANSFER WITH ASSOCIATE DEGREE	
LIBS 150, CAPL 398A, or other GenEd course (will be fulfilled by 1 credit of CMSC 100 from MC)	---
PACE 111T or other PACE 111 course	3
NSCI 362 or other approved upper-level Gen Ed Science	3UL
◆ CMST 290 (required for the major)	3
SPCH 100 or any other WRTG / SPCH / COMM	3
◆ CMST 295 (required for the major)	3
ECON 103 or other Gen Ed Behavioral / Social Science	3
◆ CMST 325 (required for the major)	3UL
◆ CMST 320 (required for the major)	3UL
WRTG 393 or other upper-level writing	3UL
◆ CMST 450 (required for the major)	3UL
Elective (must be upper-level)	3UL
◆ Any upper-level CMST course (required for upper-level major credit requirement)	3UL
Elective	3
◆ CMST 495 (required capstone course for the major)	3UL
Elective	3
Elective (must be upper-level)	3UL
Elective (must be upper-level)	3UL
Elective (must be upper-level)	3UL
Elective (must be upper-level)	3UL
Elective	3
TOTAL CREDITS REMAINING AT UMGC	**60**

NOTES: Choose any courses to meet 120 credits for degree. Note minimum requirements for upper-level coursework. Complete in last 60 credits along with major and minor courses.

** course meets content requirement but not upper-level minimum* ◆ *course in major at UMGC*
UL – *UL stands for upper-level junior/senior courses (300- or 400- level) & denotes the minimum upper-level credit that must be taken at UMGC for graduation*
Courses placed in the ELECTIVES/MINOR section may meet degree requirements depending on which course the student takes from the list of courses offered for the associate's degree. Any credit applied to the associate degree must also meet UMGC's transfer credit policy

3501 University Blvd. East | Adelphi, Maryland 20783 | Phone: 1-855-655-8682

Appendix B – Montgomery College's Articulation Agreement with Montgomery County Public Schools

College Articulation Agreements

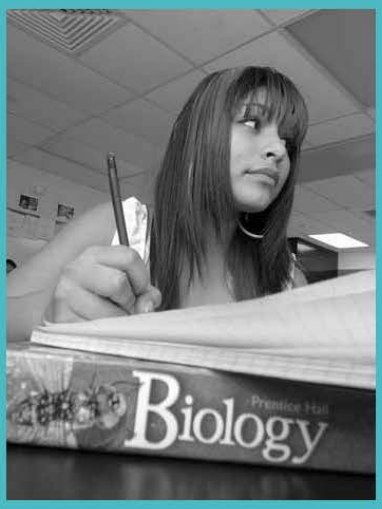
for Montgomery County Public Schools' Students

2010–2012

- Arts, Humanities, and Communication
- Biosciences, Health Science, and Medicine
- Business Management and Finance
- Construction and Development
- Education, Training, and Child Studies
- Engineering and Manufacturing
- Environmental and Natural Resources
- Hospitality and Consumer Services
- Information Technology
- Law, Government, Public Safety, and Administration
- Transportation, Distribution, and Logistics

Earn College Credit at ***NO COST***

Montgomery County Public Schools



College Tech Prep Career Clusters

Today's information-based economy demands highly skilled individuals with the ability to work with people from different cultural and educational backgrounds. Therefore, Montgomery County Public Schools, Career Pathway Programs (CPPs)strive to provide students with an education that combines rigorous academic and technical study with the excitement of discovery through small learning communities and career-themed programs. With the support of the business and higher-education communities, students apply their acquired skills and knowledge to make informed decisions concerning education, careers, and a path toward lifelong learning.

The purpose of the career cluster model is to direct high school students toward focused programs of study that make their experiences more meaningful by relating future goals to current course work. The MCPS career clusters are based on what students need to know and be able to do in order to graduate prepared for further education and careers in the 21st century. The following are the 11 MCPS career clusters:

- Arts, Humanities, Media, and Communication
- Biosciences, Health Science, and Medicine
- Business Management and Finance
- Construction and Development
- Education, Training, and Child Studies
- Engineering, Scientific Research, and Manufacturing Technologies
- Environmental, Agricultural, and Natural Resources
- Human and Consumer Services, Hospitality, and Tourism
- Information Technologies
- Law, Government, Public Safety, and Administration
- Transportation, Distribution, and Logistics

These clusters provide real-world learning experiences, including internships, while maintaining high academic standards. Students come to realize that graduation is a stepping stone to their lives beyond high school. They also acquire the skills, tools, and self-confidence to realize their dreams and goals.

Additionally, the 11 career clusters allow business leaders to be partners in education by involving them in the development of curriculum that includes industry skills and standards to meet certification requirements. Each career cluster has a Cluster Advisory Board (CAB) that collaborates with MCPS, Montgomery College (MC), and other colleges and universities to align the high school and college curriculum to promote a smooth transition from high school to post-secondary education.

Each career cluster includes one or more CPPs. Most of these programs have an articulation agreement that details the courses that MCPS students must complete with a grade of B or better to receive college credit at MC and other institutions of higher learning. Completing a CPP at a MCPS high school and articulating credits to college benefits students in several ways. It gives them a head start on their higher education while at the same time saves tuition and book fees since these courses are completed prior to college enrollment. Essentially, these College Tech Prep articulated college credits are FREE.

This brochure lists each career cluster and its respective CPPs at both MCPS and associated colleges. After reviewing this information, it will be evident which MCPS courses articulate to programs and courses at MC and other postsecondary institutions. In addition, the process of articulating credits and the forms that are necessary for successful articulation will be clear. The information in this brochure will be valid through August 30, 2011. It will be updated annually. If you have questions about the high school career clusters and CPPs, call, 240-632-6900. If you have questions about the MC CTE programs, call 240-567-4141.

Definition of Articulation

The term "articulation" describes a process by which MCPS and various colleges have agreed to align programs to award high school students with College Tech Prep credit based on successful completion of requirements as part of their high school program.

Goal of Articulation Agreements Between MCPS and MC

Students will complete a CPP and graduate from a MCPS high school to receive College Tech Prep credit free of charge to continue their education.

Guiding Principles

1. The MCPS articulation agreements build on the existing Maryland career clusters, which can be accessed at www.marylandpublicschools.org/MSDE/divisions/careertech.
2. All articulation agreements are based on national skill standards, external program certification, accreditation requirements, and the Maryland K–12/Adult Career Development Framework.
3. The CABs associated with each career cluster, which consist of industry experts, MCPS curriculum coordinators and specialists, and college instructors, provide advice to both institutions about curriculum. The CABs will work to facilitate articulation of courses between the two institutions.
4. MCPS will work collaboratively with postsecondary institutions to ensure that articulation agreements are accurate and updated on a regular basis.
5. All requirements must be met and the process for receiving credit must be followed for credit to be awarded to any individual.

Guidelines will be monitored and updated as needed.

What is the College Tech Prep program?

- It is a federally funded program designed to improve students' education and employment opportunities.
- It combines academic as well as technical knowledge and skills to prepare students for high-paying, high-skilled careers.
- It allows students to earn college credit while they are still in high school.
- It includes mathematics, science, communications, and technologies that are integrated, applied, and sequenced to avoid duplication between MCPS and MC or other postsecondary institutions.
- It is designed to provide the student with workplace skills that will allow him or her to successfully enter the job market, the military, or college.

Why should students choose a College Tech Prep career pathway program?

- Classes provide students with real-life learning experiences in the career of their choice.
- Students determine their career goals and are focused on achievement and success throughout high school.
- Students enrolled in a CPP follow their career interests in high school for a smooth transition to college.
- Students enrolled in a CPP can earn College Tech Prep credit for the courses they take in high school, with no tuition costs or book fees.
- Students enrolled in a CPP can use their learned skills to get exciting jobs in their field that provide an income to support a family.
- CPP courses build a student's confidence in his or her knowledge and abilities.

Procedure for Montgomery County Public Schools' Students to Receive College Tech Prep Credit From Montgomery College or Other Post-Secondary Institutions

Start this process AT LEAST 4 weeks prior to beginning courses at Montgomery College.

	STEPS	WHO?	WHERE?
1.	The student obtains copies of the appropriate articulation agreements and credit award forms from the school counselor, CTE teacher, or from the Internet.	• Student • Career and Technology Education (CTE) Tech Prep teacher • Foundation teacher • School counselor	High school www.montgomeryschoolsmd.org/departments/cte/toolkit/
2.	Complete the credit award form, including the letter grade received for each articulated course. Students must obtain a grade of **B** or better to receive articulated Tech Prep college credit.	Student	• High school • Home
3.	Students request that their home school registrar send an **official** high school transcript attached to the completed articulation agreement credit award form to Lesley Robinson, Tech Prep Coordinator.	• Student • High school registrar	High school
4.	Registrar will attach an official high school transcript in a sealed envelope to the articulation agreement credit award form. Forms must be sent directly from the high school (not from the student) to the Tech Prep Coordinator.	• Registrar at home high school • Tech Prep Coordinator	Transcript and form are sent to: Lesley Robinson 850 Hungerford Drive Rockville, Maryland 20850
5.	Students will receive advanced-standing College Tech Prep credit upon their full admission to a corresponding postsecondary College Tech Prep program.	Office of Admissions and Records	• Montgomery College • Community College of Baltimore • Johnson and Wales University • Pennsylvania College of Technology

Receive Free College Tech Prep Credit

Questions about this process should be directed to Lesley Robinson at 240-632-6900 or Lesley_C_Robinson@mcpsmd.org

Montgomery County Public Schools Articulation Agreements

MONTGOMERY COUNTY PUBLIC SCHOOLS (MCPS)		MONTGOMERY COLLEGE or Other College as Indicated		MCPS High Schools That Offer Program
Course No.	**Title**	**Course No.**	**Title**	
COURSE-TO-COURSE ARTICULATION AGREEMENT—*ALL CAREER CLUSTERS*				
Computer Programming Courses *Students may earn up to 18 college credits*		**Computer Applications and Programming Courses**		
2093/ 2094	Software Applications by Design A/B	CA120	Introduction to Computer Applications	All schools
2964/ 2967	Discovering Programming Concepts A/B *(Visual Basic.NET)*	CS215	Visual Basic Programming	
2989/ 2990	Computer Programming 1 A/B	CS140	Introduction to Programming	
2901/ 2902	AP Computer Programming 2 A/B *(JAVA—course only)*	CS213	Java Programming Language	
2901/ 2902	AP Computer Programming 2 A/B **and** AP Exam with a score of 4 or 5	CS213 CS103	Java Programming Language **and** Computer Science I	
2965/ 2966	Computer Programming 3 A/B *(Advanced JAVA—course only)*	CS103	Computer Science I	
Software Applications by Design Course *Students may earn up to 3 college credits*		**Computer Applications**		
2903/ 2904	Software Applications by Design A/B	CA120	Introduction to Computer Applications	
ARTS, HUMANITIES, MEDIA, AND COMMUNICATION CLUSTER				
Print Technologies & Digital Graphics I & II (PrintED) *Students may earn up to 10 college credits*		**Maryland State Articulation Agreement Computer Publishing and Printing Management A.A.S.**		
5118 5119/	Introduction to Graphic Communications **and** Digital File Preparation **and/or**	PR171	Introduction to Desktop Publishing *(4 credits)*	Thomas Edison High School of Technology
5121/ 5122	Introduction to Graphic Communications **and** Offset Press Operations **and/or**	PR116	Principles of Offset Presses I *(3 credits)*	
5121/ 5122	Introduction to Graphic Communications **and** Binding **and** Finishing	PR115	Introduction to Bindery and Finishing *(3 credits)*	
BIOSCIENCES, HEALTH SCIENCE, AND MEDICINE CAREER CLUSTER				
Biotechnology *Students may earn up to 7 college credits*		**Biotechnology, A.A.S.**		
3867 **or** 3873	Molecular Biotechnology A **and**	BT101	Introduction to Biotechnology *(2 credits)*	Northwest, Seneca Valley, Thomas Edison High School of Technology, and Wheaton
3868 **or** 3874	Molecular Biotechnology B			
3871/ 3872	Special Topics in Biotechnology A/B **and**	BT221	Biotechnology Practicum I *(2 credits)*	
3875/ 3876	Guided Research–Biosciences, Health and Science, and Medicine A/B *(Advanced Level)*			
2903/ 2904	Software Applications by Design A/B	CA120	Computer Applications *(3 credits)*	
Fire and Rescue Services/Emergency Medical Technician (Cadet Program) *Students may earn up to 10 college credits*		**Fire Science and Emergency Services, Fire and Emergency Services Management, A.A.S.**		
5423 5424	Essentials of Fire Fighting A **and** Advanced Fire & Rescue Techniques B	FS105	Fire Behavior and Combustion *(3 credits)*	Public Safety Training Academy
and/or				
5453	EMT/Basic **and**	FS150	Emergency Medical Technician—Basic I *(7 credits)* **or**	
3993/ 2802	EMT/Basic *(Science)*	HE205	First Responder *(3 credits)*	
Medical Careers *Students may earn up to 5 college credits*		**Health Information Technology, A.A.S. Physical Therapy Assistant, A.A.S.**		
5418/ 5419	Medical Careers A/B **or**	HE107	First Aid CPR *(2 credits)*	Thomas Edison High School of Technology, John F. Kennedy, Paint Branch, Sherwood, and Watkins Mill
5833/ 5834	Medical Careers A/B *(double period)* **and**			
3995 **or** 3877	Medical Careers Science and			
3996 **or** 3878	Medical Careers Science			
OPTIONAL				
2903/ 2904	Software Applications by Design A/B	CA120	Introduction to Computer Applications	

Note: Students must successfully complete the entire career pathway program with a grade of B or better to articulate MCPS work for college credit.

MONTGOMERY COUNTY PUBLIC SCHOOLS (MCPS)		MONTGOMERY COLLEGE or Other College as Indicated		MCPS High Schools That Offer Program
Course No.	Title	Course No.	Title	
BUSINESS MANAGEMENT AND FINANCE CAREER CLUSTER				
Accounting *Students may earn up to 13 college credits*		**Accounting, A.A.S.**		
4111/ 4112 4113/ 4114	Accounting A/B **and** Advanced Accounting A/B **and** pass CLEP examination with appropriate score	AC201	Principles of Accounting I *(4 credits)* (Students must have all 4 courses to take exam. Students receive MC credit upon passing an MC examination or appropriate score on CLEP examination.)	Bethesda-Chevy Chase, Montgomery Blair, Albert Einstein, Gaithersburg, Col. Zadok Magruder, Northwest, Paint Branch, Seneca Valley, Sherwood, Springbrook, and Watkins Mill
4158	Personal Finance	BA211	Personal Finance *(3 credits)*	
2315	Economics, Macroeconomics, Advanced Placement *(pass the AP exam with a 3 or higher)*	EC201	Principles of Economics I *(3 credits)*	
2316	Economics, Microeconomics, Advanced Placement *(pass the AP exam with 3 or higher)*	EC202	Principles of Economics II *(3 credits)*	
Business Administration and Management *Students may earn up to 15 college credits*		**Computer Applications, A.A.S.** **Database Systems Track; Information Technology Track**		
2903	Software Applications by Design A **and** receive Microsoft Office Specialist *(MOS)* certification at the Proficient Level in Word	CA120	Introduction to Computer Applications *(3 credits)*	Montgomery Blair, James Hubert Blake, Winston Churchill, Clarksburg, Damascus, Albert Einstein, Gaithersburg, Walter Johnson, John F. Kennedy, Col. Zadok Magruder, Richard Montgomery, Northwest, Northwood, Paint Branch, Quince Orchard, Rockville, Seneca Valley, Sherwood, Springbrook, Watkins Mill, Wheaton, Walt Whitman, and Thomas S. Wootton
2903	Software Applications by Design A **and** receive MOS certification at the Proficient Level in Excel			
2904	Software Applications by Design B **and** receive MOS certification at the Proficient Level in Access			
2904	Software Applications by Design B **and** receive MOS certification at the Proficient Level in PowerPoint			
2905	Advanced Applications by Design A **and** receive MOS certification at the Expert Level in Word	CA232	Advanced Word Processing *(3 credits)*	
2905	Advanced Applications by Design A **and** receive MOS certification at the Expert Level in Excel	CA252	Advanced Spreadsheet Applications *(3 credits)*	
2904	Advanced Applications by Design A **and** receive MOS certification at the Proficient Level in Access	CA141	Introduction to Database Applications *(3 credits)*	
4111/ 4112 4113/ 4114	Accounting A/B **and** Advanced Accounting A/B **and** pass CLEP examination with appropriate score	AC201	Accounting I *(4 credits)* (Students must complete all 4 MCPS courses to take exam–students receive MC credit upon passing CLEP examination with appropriate score.)	
4158	Personal Finance	BA211	Personal Finance *(3 credits)*	
The National Academy of Finance *Students may earn up to 13 college credits*		**Accounting, A.A.S.**		
4111/ 4112 4113/ 4114	Accounting A/B **and** Advanced Accounting A/B **and** pass CLEP examination with appropriate score	AC201	Principles of Accounting I *(4 credits)* (Students must have all 4 courses to take exam. Students receive MC credit upon passing CLEP examination with appropriate score.)	AOF Schools: Albert Einstein, Gaithersburg, Col. Zadok Magruder, Northwest, Paint Branch, and Watkins Mill
4103	Financial Planning	BA211	Personal Finance *(3 credits)*	
2315	Economics, Macroeconomics, Advanced Placement *(pass the AP exam with a 3 or higher)*	EC201	Principles of Economics I *(3 credits)*	
2316	Economics, Microeconomics, Advanced Placement *(pass the AP exam with 3 or higher)*	EC202	Principles of Economics II *(3 credits)*	
CONSTRUCTION AND DEVELOPMENT CAREER CLUSTER				
Construction and Development, Principles of Architecture and CAD Technology *Students may earn up to 7 college credits*		**Architectural and Construction Technology, A.A.S.** **CAD for the Building Professional Certificate** **Management of Construction Certificate**		
5103/ 5812 5106/ 5816	Architectural Drafting Techniques **and** Residential Design Studio **and**	CT181	Architectural Drafting Techniques *(3 credits)*. **Note:** Students must take an assessment exam with the Dept. of Applied Technologies. A letter confirming a pass grade must be submitted to MC.	Thomas Edison High School of Technology
5104/ 5813 5107/ 5817	AutoCAD with Architectural Applications **and** Advanced AutoCAD Applications	CT183	Computer Drafting: Architectural Applications *(4 credits)*. **Note:** Students must take an assessment exam with the Dept. of Applied Technologies. A letter confirming a pass grade must be submitted to MC.	

Note: Students must successfully complete the entire career pathway program with a grade of B or better to articulate MCPS work for college credit.

MONTGOMERY COUNTY PUBLIC SCHOOLS (MCPS)		MONTGOMERY COLLEGE or Other College as Indicated		MCPS High Schools That Offer Program
Course No.	**Title**	**Course No.**	**Title**	
EDUCATION, TRAINING, AND CHILD STUDIES CAREER CLUSTER				
Early Child Development *Students may earn up to 9 college credits*		**Early Childhood Education Technology, A.A.S.** **Early Childhood Education Certificate**		
4847 **or** 4851	Child and Adolescent Development 1A *(single period)* **or** Child and Adolescent Development 1A (double period) and	ED120	Child Growth and Development *(3 credits)*	Bethesda-Chevy Chase, Montgomery Blair, James Hubert Blake, Clarksburg, Damascus, Gaithersburg, Walter Johnson, John F. Kennedy, Col. Zadok Magruder, Northwest, Northwood, Paint Branch, Quince Orchard, Rockville, Seneca Valley, Sherwood, Springbrook, Watkins Mill, Wheaton, Walt Whitman, and Thomas S. Wootton
		and		
4848 **or** 4852	Child and Adolescent Development 1B *(single period)* **or** Child and Adolescent Development 1B *(double period)* **and**	ED121	Curriculum Planning in Early Childhood Education *(3 credits)*	
4849 **or** 4853	Child and Adolescent Development 2A *(single period)* **or** Child and Adolescent Development 2A *(double period)* **and**			
4850 **or** 4854	Child and Adolescent Development 2B *(single period)* **or** Child and Adolescent Development 2B *(double period)* **and**			
4866 4867	Child and Adolescent Development 3A *(single period)* **and** Child and Adolescent Development 3B *(single period)*			
4860	Education, Training, **and** Child Studies Internship *(single period)*	ED122	Child Care Practicum and Workshop *(3 credits)*	
Students must submit program portfolios and the Daily Log of Activities from the Program Internship.				
ENGINEERING, SCIENTIFIC RESEARCH, AND MANUFACTURING TECHNOLOGIES CAREER CLUSTER				
Project Lead the Way–Advanced Engineering *Students may earn up to 3 college credits*		**Engineering Science A.S.**		
5150/ 5151	Principles of Engineering A/B **and**	ES100	Introduction to Engineering Design *(3 credits)*	Col. Zadok Magruder, Paint Branch, Poolesville, Rockville, Walt Whitman, Wheaton, and Watkins Mill
5152/ 5153	Introduction to Engineering Design A/B **and**			
5156/ 5157	Digital Electronics A/B **and a choice of:**			
5158/ 5159	Engineering Design and Development A/B **or**			
5154/ 5155	Computer Integrated Manufacturing A/B **or**			
5721/ 5722	Aerospace Engineering A/B **or**			
4255/ 4256	Civil Engineering Architecture A/B			
HUMAN AND CONSUMER SERVICES, HOSPITALITY, AND TOURISM CAREER CLUSTER				
Hospitality Management *Students may earn up to 5 college credits*		**BALTIMORE INTERNATIONAL COLLEGE: Hospitality Management ; Hospitality Management with a concentration in Marketing**		
4630/ 4640	International Cultures and Cusines A/B with ProStart 1 and ServSafe® exams **and**	FPM110/ 111	Food Protection Management/ Certification *(2 credits)*	Clarksburg, Damascus, Albert Einstein, Gaithersburg, Walter Johnson, John F. Kennedy, Col. Zadok Magruder, Richard Montgomery, Northwest, Paint Branch, Quince Orchard, Rockville, Sherwood, Springbrook, Watkins Mill, Wheaton, Walt Whitman, and Thomas S. Wootton
4825/ 4826	Culinary Essentials A/B with ProStart 2 exam **and**	CA111	Food and Beverage Purchasing *(3 credits)*	
4816	Human and Consumer Services, Hospitality and Tourism Internship A/B **and** pass sanitation certification exam with a 75% or better			

Note: Students must successfully complete the entire career pathway program with a grade of B or better to articulate MCPS work for college credit.

MONTGOMERY COUNTY PUBLIC SCHOOLS (MCPS)		MONTGOMERY COLLEGE or Other College as Indicated		MCPS High Schools That Offer Program
Course No.	**Title**	**Course No.**	**Title**	
Hospitality Management *Students may earn up to 7 college credits*		**ANNE ARUNDEL COMMUNITY COLLEGE** **Hotel/Restaurant Management Degree or Certificate**		
4630/ 4640	International Cultures and Cusines A/B with ProStart I **and** ServSafe® exams **and**	HRM119	Certification in Sanitation *(1 credit)*	Clarksburg, Damascus, Albert Einstein, Gaithersburg, Walter Johnson, John F. Kennedy, Col. Zadok Magruder, Richard Montgomery, Northwest, Paint Branch, Quince Orchard, Rockville, Sherwood, Springbrook, Watkins Mill, Wheaton, Walt Whitman, and Thomas S. Wootton
4825/ 4826	Culinary Essentials A/B/with ProStart II exam **and**	HRM121	Introduction to Food Preparation *(3 credits)*	
4816	Human and Consumer Services, Hospitality and Tourism Internship A/B	HRM275	Practicum in Hotel/Restaurant Management *(3 credits)*	
Professional Restaurant Management *Students may earn up to 1 college credit*		**Hospitality Management A.A.S.** **Food and Beverage Management Certificate**		
4821	Professional Restaurant Management 1A *(single period)* **or**	FM105	Food Service Sanitation *(1 credit)*	Thomas Edison High School of Technology, Damascus, and Paint Branch
4823	Professional Restaurant Management 1A *(double period)* **or**			
4834	Professional Restaurant Management 1A *(triple period)* **and**			
4822	Professional Restaurant Management 1B *(single period)* **or**			
4824	Professional Restaurant Management 1B *(double period)* **or**			
4835	Professional Restaurant Management 1B *(triple period)* **and**			
	Pass ServeSafe Food Protection Manager Certification exam			
Professional Restaurant Management *Students may earn up to 9 quarter college credits*		**JOHNSON AND WALES UNIVERSITY** **Culinary Arts A.A.**		
4821	Professional Restaurant Management 1A *(single period)* **or**	CUL1345	Introduction to Baking and Pastry Arts	Thomas Edison High School of Technology, Damascus, and Paint Branch
4823	Professional Restaurant Management 1A *(double period)* **or**	CUL1355	New World Cuisine	
4834	Professional Restaurant Management 1A *(triple period)* **and**			
4822	Professional Restaurant Management 1B *(single period)* **or**			
4824	Professional Restaurant Management 1B *(double period)* **or**	CUL1385	Fundamentals of Food Service Production	
4835	Professional Restaurant Management 1B *(triple period)* **and**			
	Pass ServeSafe Food Protection Manager Certification exam			
INFORMATION TECHNOLOGIES CAREER CLUSTER				
Cisco Networking Academy **National Academy of Information Technology (AOIT)** **Networking and Hardware Option** *Students may earn up to 24 college credits*		**Network and Wireless Technologies, A.A.S.** **Wireless Technologies Certificate** **Microcomputer Technician Certificate** **Network Engineer Certificate**		
2989/ 2990	Computer Programming I A/B *(Advanced Level)*	CS 140	Introduction to Programming *(3 credits)*	**AOIT schools:** Damascus, Gaithersburg, Seneca Valley, Springbrook, Wheaton, and Thomas S. Wootton
5611/ 5612 **or** 4214/ 4215 **or** 5613/ 5614 **or** 4216/ 4217	Microcomputer Technologies A/B **and** pass the Cisco IT Essential I online final exam with a score of 80% or better or successfully complete the CompTIA A+ exam.	NW127 NW140	Microcomputer Control Programs *(3 credits)* **and** Microcomputer Configuration and Installation (3 credits)	

Note: Students must successfully complete the entire career pathway program with a grade of B or better to articulate MCPS work for college credit.

MONTGOMERY COUNTY PUBLIC SCHOOLS (MCPS)		MONTGOMERY COLLEGE or Other College as Indicated		MCPS High Schools That Offer Program
Course No.	**Title**	**Course No.**	**Title**	
INFORMATION TECHNOLOGIES CAREER CLUSTER (continued)				
5615/ 5616 **or** 4218/ 4219 **or** 5617/ 5618 **or** 4220/ 4221	Network Engineering and Management A/B **and** pass the Cisco CCNA Discovery online final exam with a score of 80% or better or successfully complete the CCNET certification exam.	NW151	Introduction to Networking *(3 credits)*	**Non-AOIT schools with program:** Bethesda/Chevy Chase, Montgomery Blair, Northwest, and Quince Orchard
4230/ 4231	Advanced Network Engineering **and** Management A/B and pass the Cisco CCNA 3 & 4 online final exam with a score of 80% or better.	NW252	Cisco Routers and Routing Basics *(3 credits)*	
4230/ 4231	Advanced Network Engineering and Management A/B **and** successfully complete the Cisco CCNA ICND1 and ICND2 certification exams.	NW252 NW253 NW254	Cisco Routers and Routing Basics *(3 credits)* **and** Cisco Router Configuration—Semester 3 *(3 credits)* **and** Cisco Router Configuration and Management III Cisco Networking Academy—Semester 4 *(3 credits)*	
National Academy of Information Technology (AOIT) Information Resource Design Option *Students may earn up to 24 college credits*		**Computer Science and Technologies, A.A. Computer Gaming and Simulation, A.A.**		
2991/ 2992	Web Site Development A/B	CA272	Professional Web Site Development with XHTML *(4 credits)*	Damascus, Gaithersburg, Northwest, Seneca Valley, Springbrook, Wheaton, and Thomas S. Wootton
2936/ 2937	Advanced Web Tools and Digital Media A/B and WOW certification	CA273	Advanced Professioanl Web Technologies *(3 credits)*	
4232/ 4233	Database Administration Programming A/B and Oracle Certification	CS270	Introduction to SQL Using Oracle *(3 credits)* **Note:** Students must pass CS140 and have Oracle Certification prior to receiving credit	
2989/ 2990	Computer Programming 1 A/B *(Advanced Level)*	CS140	Introduction to Programming *(3 credits)*	
2901/ 2902	AP Computer Programming 2A/B	CS213	Java Programming Language *(3 credits)*	
2901/ 2902	AP Computer Programming 2A/B **and** AP exam with a score of 4 or 5 **or**	CS103 CS213	Computer Science I *(4 credits)* **and** Java Programming Language (3 credits)	
2965/ 2966	Computer Programming 3A/B	CS103	Computer Science I *(3 credits)*	
2965/ 2966	Computer Programming 3A/B and AP exam with a score of 3, 4, or 5	CS214 CS103	Advanced Java Programming Language **and** Computer Science I *(4 credits)*	
National Academy of Information Technology Computer Programming Option *Students may earn up to 24 college credits*		**Computer Science and Technologies A.A. Web Careers, A.A.S;**		
2964/ 2967	Discovering Programming Concepts I A/B *(Visual Basic.NET)*	CS215	Visual Basic Programming *(3 credits)*	Damascus, Gaithersburg, Seneca Valley, Springbrook, Wheaton, and Thomas S. Wootton
2989/ 2990	Computer Programming 1 A/B	CS140	Introduction to Programming *(3 credits)*	
2901/ 2902	AP Computer Programming 2 A/B *(JAVA—course only)*	CS213	Java Programming Language *(3 credits)*	
2901/ 2902	AP Computer Programming 2 A/B *(JAVA)* **and** AP Exam with a score of 4 or 5	CS213 CS103	Java Programming Language *(3 credits)* **or** Computer Science I (4 credits)	
2965/ 2966	Computer Programming 3 A/B	CS103	Computer Science I *(4 credits)*	
2965/ 2966	Computer Programming 3 A/B **and** AP Exam with a score of 3, 4, and 5	CS214	Java Programming Language *(3 credits)*	
Network Operations **Students may earn up to 9 college credits**		**Network and Wireless Technologies A.A.S., Microcomputer Track, Cisco Track, Wireless Technolgies Track**		
4202/ 4203	Network Operations A/B *(triple period)* (3 credits) **or**	NW127 NW140	Microcomputer Control Programs *(3 credits)* **and** Microcomputer Configuration and Installation *(3 credits)* **and**	Clarksburg, Rockville, and Thomas Edison High School of Technology
4242/ 4243/ 4244	Network Operations 1A/B and 2 *(double period)* (3 credits)	NW151	Introduction to Networking *(3 credits)*	
CompTIA A+ exam must be passed for NW127/NW140; Comp TIA Network+ exam must be passed for NW151				

Note: Students must successfully complete the entire career pathway program with a grade of B or better to articulate MCPS work for college credit.

MONTGOMERY COUNTY PUBLIC SCHOOLS (MCPS)		MONTGOMERY COLLEGE or Other College as Indicated		MCPS High Schools That Offer Program
Course No.	**Title**	**Course No.**	**Title**	
Network Operations *Students may earn up to 6 college credits*		**CAPITOL COLLEGE** **Telecommunications Engineering Technology, B.S.**		
4202/ 4203	Network Operations A/B *(triple period)* *(3 credits)* **or**	TC191	Computer Architecture and Networking *(6 credits)*	Clarksburg, Rockville, and Thomas Edison High School of Technology
4242/ 4243/ 4244	Network Operations 1A/B and 2 *(double period)* (3 credits)			
CompTIA A+ exam and Comp TIA Network+ exam must be passed for TC191				
Network Operations *Students may earn up to 16 college credits*		**COMMUNITY COLLEGE OF BALTIMORE COUNTY** **Network Technology, A.A.S.**		
4202/ 4203	Network Operations A/B *(triple period) (3 credits)* **or**	CINS141	Introduction to PC Operations and Repair *(4 credits)*	Clarksburg, Rockville, and Thomas Edison High School of Technology
4242/ 4243/ 4244	Network Operations 1A/B **and** 2 *(double period) (3 credits)*	CINS232	Computer Systems Operations, Maintenance, and Troubleshooting *(4 credits)*	
		DCOM101	Introduction to Data Communications *(4 credits)*	
		DCOM251	Local Area Networks-Net+ *(4 credits)*	
CompTIA A+ exam must be passed for CINS141/232; Comp TIA Network+ exam must be passed for DCOM101/251				
Network Operations *Students may earn up to 6 college credits*		**DEVRY UNIVERSITY** **Network Systems Administration, A.A.S.** **Network and Communications Management, B.S.**		
4202/ 4203	Network Operations A/B *(triple period)* *(3 credits)* **or**	COMP129	PC Hardware and Software with Lab *(3 credits)*	Clarksburg, Rockville, and Thomas Edison High School of Technology
4242/ 4243/ 4244	Network Operations 1A/B and 2 *(double period)* (3 credits)	NETW202	Introduction to Networking with Lab *(3 credits)*	
CompTIA A+ exam must be passed for COMP129; Comp TIA Network+ exam must be passed for NETW202				
Network Operations *Students may earn up to 9 college credits*		**HAGERSTOWN COMMUNITY COLLEGE** **Information Systems Technology, A.A.S.** **Computer Forensics, Computer Support Specialist, Networking Technology**		
4202/ 4203	Network Operations A/B *(triple period)* *(3 credits)* **or**	IST150	PC Tech: Repair and Troubleshooting *(3 credits)*	Clarksburg, Rockville, and Thomas Edison High School of Technology
4242/ 4243/ 4244	Network Operations 1A/B and 2 *(double period)* (3 credits)	IST151	PC Tech Operating Systems *(3 credits)*	
		IST154	Networking Basics *(3 credits)*	
CompTIA A+ exam must be passed for IST150/151; Comp TIA Network+ exam must be passed for IST154				
Oracle Internet Database Academy *Students may earn up to 13 college credits*		**Web Careers A.A.S. Web Programming Track, Web Development Track**		
2989/ 2990	Computer Programming 1 A/B	CS140	Introduction to Programming *(3 credits)*	Clarksburg, Gaithersburg, Seneca Valley, Wheaton, and Thomas S. Wootton
2901/ 2902	AP Computer Programming 2 A/B *(JAVA–course only)*	CS213	Java Programming Language *(3 credits)*	
4232/ 4233	Database Administration Programming A/B and Oracle Certification	CS270	Introduction to SQL Using Oracle *(3 credits (Note: Students must pass CS140 and have Oracle Certification prior to receiving credit)*	
Students must additionally provide evidence of having passed certain CompTIA exams for credit to be awarded.				
LAW, GOVERNMENT, PUBLIC SAFETY, AND ADMINISTRATION CAREER CLUSTER				
Justice, Law, and Society *Students may earn up to 6 college credits*		**Paralegal Studies, A.A.S.**		
5148/ 5149	Introduction to Justice, Law, and Society A/B **and**	LA101	Introduction to the Legal System *(3 credits)*	Montgomery Blair, Northwood, Seneca Valley, and Springbrook
5146/ 5147	Law and the Administration of Justice A/B **and**			
5144/ 5145	Contemporary Issues in Justice, Law, and Society A/B *(single period)* **or**			
5134	Contemporary Issues in Justice, Law, and Society A/B *(double period)*			
2903/ 2904	Software Applications by Design A/B	CA120	Computer Applications *(3 credits)*	

Note: Students must successfully complete the entire career pathway program with a grade of B or better to articulate MCPS work for college credit.

MONTGOMERY COUNTY PUBLIC SCHOOLS (MCPS)		MONTGOMERY COLLEGE or Other College as Indicated		MCPS High Schools That Offer Program
Course No.	**Title**	**Course No.**	**Title**	
TRANSPORTATION, DISTRIBUTION, AND LOGISTICS CAREER CLUSTERS				
Automotive Technology *Students may earn up to 6 college credits*		**Automotive Technology A.A.S.**		
Option 1				
5061/ 5062 5045/ 5046	Automotive Technology Dealership Training 1 A/B** *(triple period)* **or** Foundations of Automotive Technology 1 A/B **and**	AT101	Introduction to Automotive Technology *(3 credits)*	Damascus, Gaithersburg, Seneca Valley, and Thomas Edison High School of Technology
5067/ 5068 5045/ 5046	Automotive Technology Dealership Training 2 A/B** *(triple period)* **or** Foundations of Automotive Technology 1 A/B			
*5703	Automotive Technology Internship can be subsituted for 5068 only **Students must complete either the 5061/5062 or the 5067/5068* sequence			
Option 2				
5072/ 5073	Automotive Technology Dealership Training 1 A/B *(double period)* **and**			
5049/ 5050	Automotive Technology Dealership Training 2 A/B *(double period)*			
Automotive Technology/Dealership Training *Students may earn up to 18 college credits*		**THE COMMUNITY COLLEGE OF BALTIMORE COUNTY** **Maryland State Department of Education Agreement** **Automotive Technology, A.A.S**		
5061/ 5062	Automotive Technology/Dealership Training 1 *(Brakes and Electrical) (triple period) (3 credits)* **or**	AUTO126	Repairing Automotive Brake Systems *(4 credits)*	Damascus, Gaithersburg, Seneca Valley, and Thomas Edison High School of Technology
5045/ 5046	Automotive Technology/Dealership Training 1 *(Brakes and Electrical) (double period) (2 credits)*	AUTO131	Servicing Automotive Electrical and Electronic Systems *(5 credits)*	
5067/ 5068	Automotive Technology/Dealership Training 2 *(Suspension and Steering and Engine Performance) (triple period) (3 credits)* or	AUTO141	Servicing Automotive Engines and Related Systems *(5 credits)*	
5049/ 5050	Automotive Technology/Dealership Training 2 *(Suspension and Steering and Engine Performance) (double period) (2 credits)*	AUTO171	Repairing Automotive Steering and Suspension Systems *(4 credits)*	
Automotive Technology/Dearlership Training **Students may earn up to 15 college credits**		**PENNSYLVANIA COLLEGE OF TECHNOLOGY** **Maryland State Department of Education Agreement** **Automotive Technology, A.A.S**		
5072 or 5061	Automotive Technology/Dealership Training 1A *(Suspension and Steering)(double or triple period) (1 or 1.5 credits)*	AMT112	Brake Systems *(3 credits)*	Damascus, Gaithersburg, Seneca Valley, and Thomas Edison High School of Technology
5049 or 5067	Automotive Technology/Dealership Training 2A *(Suspension and Steering)(double or triple period) (1 or 1.5 credits)*	AMT113	Steering and Suspension *(3 credits)*	
5073 or 5062	Automotive Technology/Dealership Training 1B *(Electrical) (double or triple period) (1 or 1.5 credits)*	AMT126 AMT121	Engine Electrical Systems *(4 credits)* Automotive Fuel and Emission Control Systems *(2 credits)*	
5050 or 5068	Automotive Technology/Dealership Training 2B *(Engine Performance) (double or triple period) (1 or 1.5 credits)*	AMT109	Automotive Electrical Fundamentals *(3 credits)*	

Note: Students must successfully complete the entire career pathway program with a grade of B or better to articulate MCPS work for college credit.

Program Overview

Web Page, Digital/Multimedia and Information Resources

DesignEmsi Q1 2021 Data Set

January 2021

Emsi

409 S. Jackson St.
Moscow, Idaho
83843

Parameters

Programs:

Code	Description
11.0801	Web Page, Digital/Multimedia and Information Resources Design

Regions:
20 items selected. See Appendix A for details.

Education Level: Any

Tuition Type: Tuition & Fees

Graduate Status: Undergraduate

Residency: In-State

Completions Year: 2019

Jobs Timeframe: 2019 - 2024

Job Postings Timeframe: Jan 2020 - Dec 2020

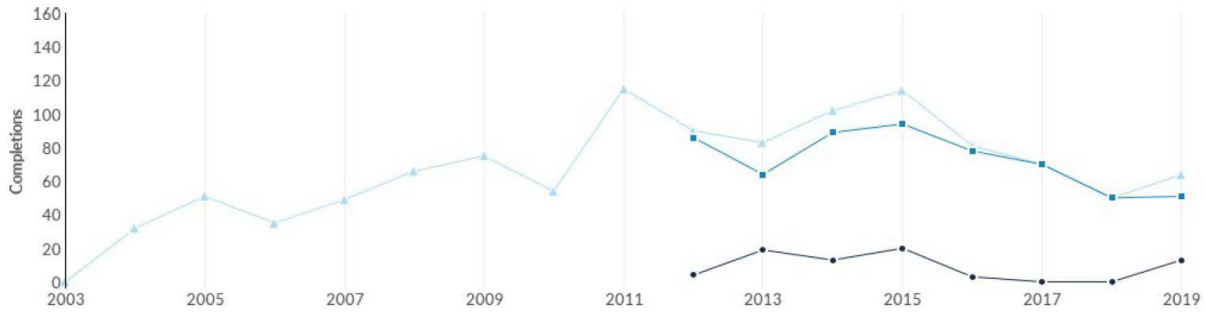
Program Overview

	Completions (2019)	% Completions	Institutions (2019)	% Institutions
All Programs	64	100%	6	100%
Distance Offered Programs	13	20%	2	33%
Non-Distance Offered Programs	51	80%	6	100%

Completions by Institution

Institution	Completions (2019	Growth % YOY (2019)	Market Share (2019)	IPEDS Tuition & Fees (2019)
Northern Virginia Community College	23	43.8%	35.9%	$5,610
University of Baltimore	19	Insf. Data	29.7%	$9,096
Montgomery College	12	71.4%	18.8%	$10,254
Anne Arundel Community College	5	0.0%	7.8%	$8,240
DeVry University-Virginia	3	50.0%	4.7%	$15,500
Prince George's Community College	2	Insf. Data	3.1%	$6,050

Regional Trends



	2012 Completions	2019 Completions	% Change
Distance Offered Programs	4	13	+225.0%
Non-Distance Offered Programs	86	51	-40.7%
All Programs	90	64	-28.9%

Regional Completions by Award Level

Award Level	Completions (2019	Percent
Award of less than 1 academic year	35	54.7%
Associate's Degree	8	12.5%
Bachelor's Degree	2	3.1%
Postbaccalaureate certificate	11	17.2%
Master's Degree	8	12.5%
Award of at least 1 but less than 2 academic years	0	0.0%
Award of at least 2 but less than 4 academic years	0	0.0%
Post-masters certificate	0	0.0%
Doctor's Degree	0	0.0%

Similar Programs

26	10,173
Programs	**Completions**

CIP Code	Program	Completions (2019)
11.1003	Computer and Information Systems Security/Information Assurance	2,727
11.0101	Computer and Information Sciences, General	2,001
11.0701	Computer Science	1,932
11.0103	Information Technology	1,758
14.0901	Computer Engineering, General	302
43.0116	Cyber/Computer Forensics and Counterterrorism	239
11.0901	Computer Systems Networking and Telecommunications	232
50.0409	Graphic Design	153
11.1005	Information Technology Project Management	121
10.0304	Animation, Interactive Technology, Video Graphics and Special Effects	120

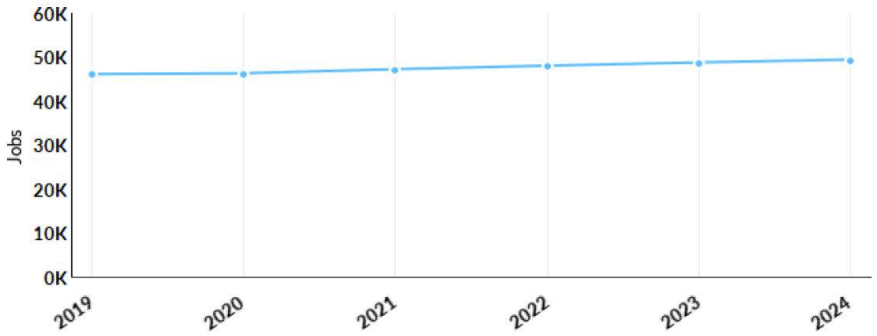
Target Occupations

46,062	+7.2%	$49.33/hr $102.6K/yr	3,935
Jobs (2019)	**% Change (2019-2024)**	**Median Earnings**	**Annual Openings**
100% above National average	Nation: +5.8%	Nation: $35.06/hr; $72.9K/yr	

Occupation	2019 Jobs	Annual Openings	Median Earnings	Growth (2019 - 2024)	Location Quotient (2019)
Information Security Analysts	17,131	1,661	$55.77/hr	+13.97%	4.48
Computer Network Architects	11,621	744	$62.28/hr	+2.33%	2.56
Web Developers and Digital Interface Designers	8,410	697	$37.84/hr	+6.81%	1.58
Graphic Designers	7,778	710	$31.21/hr	+0.40%	0.99
Special Effects Artists and Animators	1,122	122	$28.67/hr	+4.72%	0.78

Growth

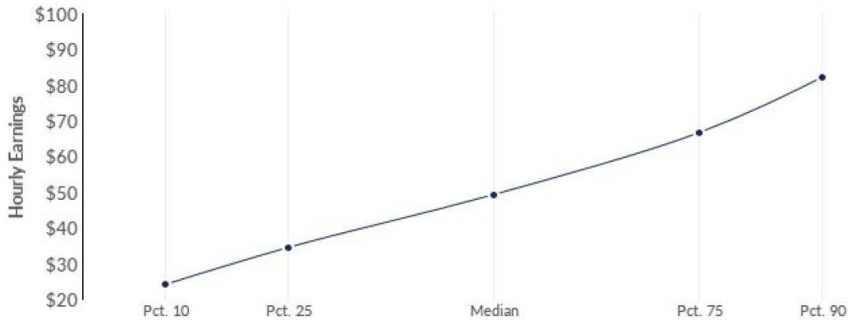
46,062	49,384	3,322	7.2%
2019 Jobs	**2024 Jobs**	**Change (2019-2024)**	**% Change (2019-2024)**



Occupation	2019 Jobs	2024 Jobs	Change	% Change
Information Security Analysts (15-1212)	17,131	19,525	2,394	14%
Computer Network Architects (15-1241)	11,621	11,892	271	2%
Web Developers and Digital Interface Designers (15-1257)	8,410	8,983	573	7%
Special Effects Artists and Animators (27-1014)	1,122	1,175	53	5%
Graphic Designers (27-1024)	7,778	7,809	31	0%

Percentile Earnings

$34.50/hr	$49.33/hr	$66.72/hr
25th Percentile Earnings	**Median Earnings**	**75th Percentile Earnings**



Occupation	25th Percentile Earnings	Median Earnings	75th Percentile Earnings
Information Security Analysts (15-1212)	$42.29	$55.77	$71.38
Computer Network Architects (15-1241)	$48.35	$62.28	$78.20
Web Developers and Digital Interface Designers (15-1257)	$26.90	$37.84	$52.08
Special Effects Artists and Animators (27-1014)	$12.69	$28.67	$43.92
Graphic Designers (27-1024)	$22.04	$31.21	$42.88

Job Postings Summary

92,310	6 : 1	37 days
Unique Postings	**Posting Intensity**	**Median Posting Duration**
559,693 Total Postings	Regional Average: 5 : 1	Regional Average: 35 days

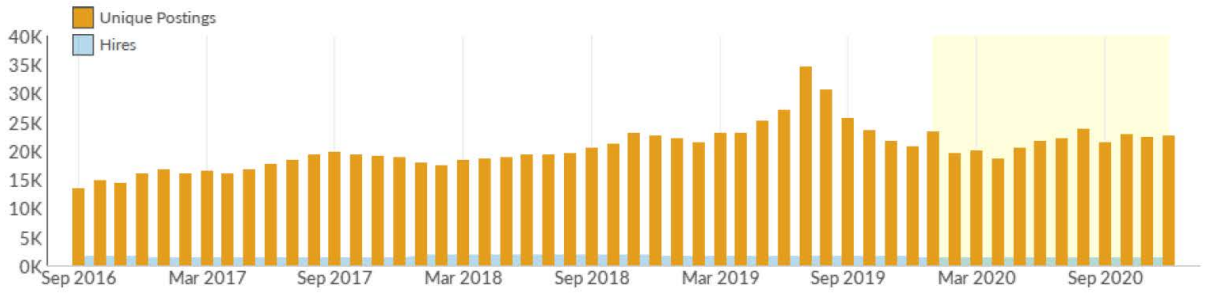
There were **559,693** total job postings for your selection from January 2020 to December 2020, of which **92,310** were unique. These numbers give us a Posting Intensity of **6-to-1**, meaning that for every 6 postings there is 1 unique job posting.

This is higher than the Posting Intensity for all other occupations and companies in the region (5-to-1), indicating that they may be trying harder to hire for this position.

Job Postings vs. Hires

21,554	1,518
Avg. Monthly Postings (Jan 2020 - Dec	**Avg. Monthly Hires (Jan 2020 - Dec**

In an average month, there were **21,554** active job postings for 5 Occupations, and **1,518** actually hired. This means there was approximately 1 hire for every 14 unique job postings for 5 Occupations.



Occupation	Avg Monthly Postings (Jan 2020 - Dec	Avg Monthly Hires (Jan 2020 - Dec 2020)
Information Security Analysts	13,036	673
Web Developers and Digital Interface Designers	6,455	243
Graphic Designers	1,023	253
Computer Network Architects	952	315
Special Effects Artists and Animators	88	34

Top Companies Posting

Company	Total/Unique (Jan 2020 - Dec 2020)	Posting Intensity	Median Posting Duration
Leidos Holdings, Inc.	47,716 / 3,952	12 : 1	48 days
General Dynamics Corporation	35,213 / 2,988	12 : 1	61 days
Booz Allen Hamilton Holding Corporation	15,003 / 1,947	8 : 1	59 days
Science Applications International Corporation	12,016 / 1,817	7 : 1	45 days
Mantech International Corporation	17,711 / 1,475	12 : 1	64 days
Caci International Inc	11,490 / 1,273	9 : 1	70 days
Deloitte LLP	8,803 / 1,252	7 : 1	56 days
Perspecta, Inc.	10,833 / 1,131	10 : 1	55 days
Northrop Grumman Corporation	8,173 / 959	9 : 1	53 days
Latitude Inc	1,698 / 913	2 : 1	15 days

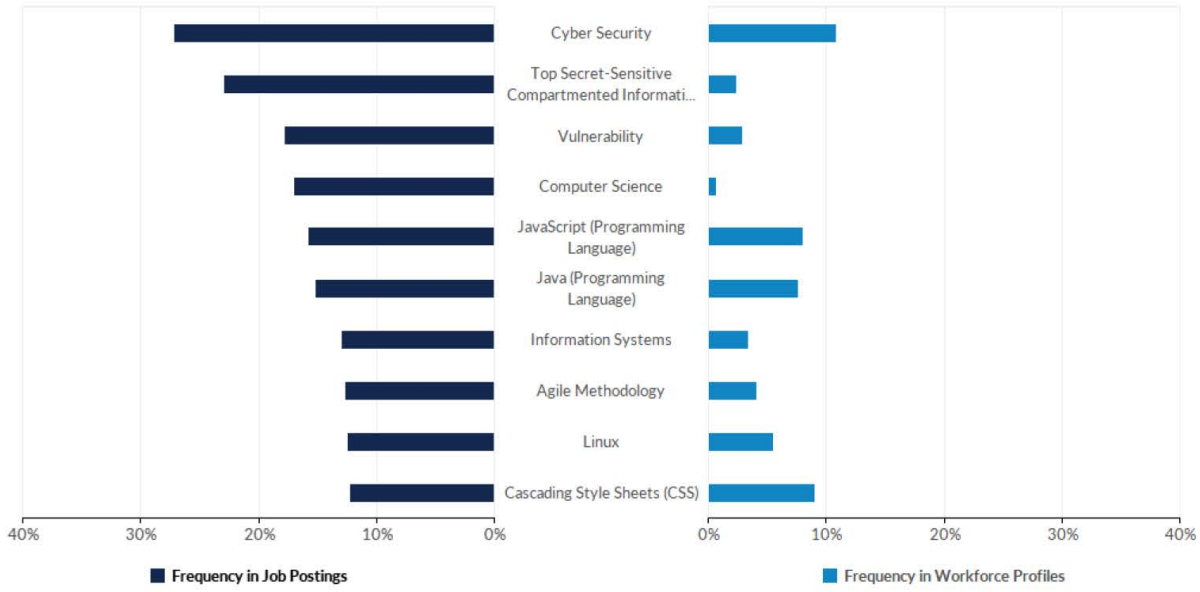
Top Posted Job Titles

Job Title Dec	Total/Unique (Jan 2020 - 2020	Posting Intensity	Median Posting Duration
Java Developers	17,274 / 3,511	5 : 1	33 days
Information Systems Security Officers	20,317 / 2,637	8 : 1	44 days
Cybersecurity Engineers	22,923 / 2,600	9 : 1	38 days
Cybersecurity Analysts	13,435 / 1,821	7 : 1	46 days
Web Developers	9,624 / 1,659	6 : 1	43 days
Sharepoint Developers	8,602 / 1,556	6 : 1	42 days
Security Engineers	9,187 / 1,460	6 : 1	42 days
Information Systems Security Engineers	8,716 / 1,082	8 : 1	36 days
Graphic Designers	4,147 / 1,029	4 : 1	33 days
Cybersecurity Specialists	6,751 / 893	8 : 1	38 days

The following provides insight into the supply and demand of relevant skills by comparing the frequency of skills present in job postings against skills present in today's workforce. Along with Emsi's job posting analytics, this comparison leverages Emsi's dataset of more than 100M online resumés and profiles. All resumés and profiles used in these comparisons have been updated within the last three years.

*The skills associated with workforce profiles represent workers of all education and experience levels.

Top Hard Skills

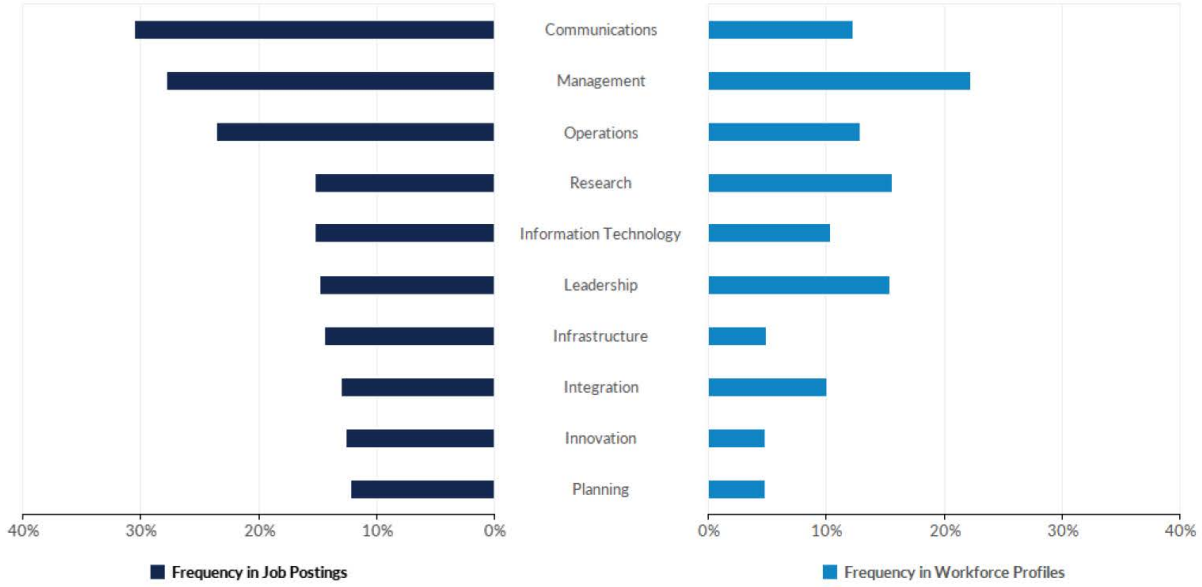


Top Hard Skills

Skill	Frequency in Postings	Postings with Skill /Total Postings (Jan2020 - Dec 2020)	Frequency in Profiles	Profiles with Skill /Total Profiles (2019 - 2021)
Cyber Security	27%	25,078 / 92,310	11%	5,082 / 46,582
Top Secret-Sensitive Compartmented Information (TS/SCI Clearance)	23%	21,242 / 92,310	2%	1,145 / 46,582
Vulnerability	18%	16,482 / 92,310	3%	1,345 / 46,582

Computer Science	17%	15,715 / 92,310	1%	307 / 46,582
JavaScript (Programming Language)	16%	14,557 / 92,310	8%	3,764 / 46,582
Java (Programming Language)	15%	14,090 / 92,310	8%	3,560 / 46,582
Information Systems	13%	11,987 / 92,310	3%	1,579 / 46,582
Agile Methodology	13%	11,737 / 92,310	4%	1,903 / 46,582
Linux	13%	11,541 / 92,310	6%	2,595 / 46,582
Cascading Style Sheets (CSS)	12%	11,364 / 92,310	9%	4,215 / 46,582

Top Common Skills



Top Common Skills

Skill	Frequency in Postings	Postings with Skill /Total Postings (Jan2020 - Dec 2020)	Frequency in Profiles	Profiles with Skill /Total Profiles (2019 - 2021)
Communications	31%	28,223 / 92,310	12%	5,710 / 46,582
Management	28%	25,626 / 92,310	22%	10,351 / 46,582
Operations	24%	21,784 / 92,310	13%	6,029 / 46,582
Research	15%	14,048 / 92,310	16%	7,267 / 46,582
Information Technology	15%	14,029 / 92,310	10%	4,814 / 46,582
Leadership	15%	13,718 / 92,310	15%	7,182 / 46,582

Data Emsi

Infrastructure	14%	13,266 / 92,310	5%	2,322 / 46,582
Integration	13%	11,994 / 92,310	10%	4,705 / 46,582
Innovation	13%	11,657 / 92,310	5%	2,262 / 46,582
Planning	12%	11,261 / 92,310	5%	2,237 / 46,582

Top Qualifications

Qualification	Postings with Qualification
Certified Information Systems Security Professional	14,915
GIAC Certifications	7,553
CompTIA Security+	6,935
Certified Ethical Hacker	4,634
Certified Information Security Manager	4,355
Certified Information System Auditor (CISA)	3,617
IAT Level II Certification	3,562
GIAC Certified Incident Handler	2,883
Cisco Certified Network Associate	2,178
GIAC Security Essentials Certification	1,957

Data Emsi

Appendix A - Regions

Code	Description	Code	Description
11001	District of Columbia County, DC	51013	Arlington County, VA
24003	Anne Arundel County, MD	51059	Fairfax County, VA
24005	Baltimore County, MD	51061	Fauquier County, VA
24013	Carroll County, MD	51107	Loudoun County, VA
24017	Charles County, MD	51153	Prince William County, VA
24021	Frederick County, MD	51510	Alexandria City County, VA
24027	Howard County, MD	51600	Fairfax City County, VA
24031	Montgomery County, MD	51610	Falls Church City County, VA
24033	Prince George's County, MD	51683	Manassas City County, VA
24510	Baltimore City County, MD	51685	Manassas Park City County, VA

Appendix B - Data Sources and Calculations

Institution Data

The institution data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Occupation Data

Emsi occupation employment data are based on final Emsi industry data and final Emsi staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level Emsi earnings by industry.

Emsi Job Postings

Job postings are collected from various sources and processed/enriched to provide information such as standardized company name, occupation, skills, and geography.

State Data Sources

This report uses state data from the following agencies: District of Columbia Department of Employment Services; Maryland Department of Labor, Licensing and Regulation, Office of Labor Market Analysis and Information; Virginia Employment Commission, Economic Information Services