Office Use Only: PP#

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

Institution Submitting Proposal	Anne Arundel Community 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 # 0553058 ○ Check # 0553058

Payment Amount: $250.00

Date Submitted: 8/15/2023

Department Proposing Program	Computer Science	
Degree Level and Degree Type	A.A.S.	
Title of Proposed Program	Web and Mobile Application Development (A.A.S.).	
Total Number of Credits	60	
Suggested Codes	HEGIS: 5199.05	CIP: 11.9999
Program Modality	◉ On-campus ○ Distance Education (fully online) ○ Both	
Program Resources	◉ Using Existing Resources ○ Requiring New Resources	
Projected Implementation Date (must be 60 days from proposal submisison as per COMAR 13B.02.03.03)	○ Fall ◉ Spring ○ Summer	Year: 2024
Provide Link to Most Recent Academic Catalog	URL: https://catalog.aacc.edu/	
Preferred Contact for this Proposal	Name: Dr. Tanya Millner	
	Title: Provost/Vice President for Learning	
	Phone: (410) 777-2332	
	Email: tcmillner@aacc.edu	
President/Chief Executive	Type Name: Dawn Lindsay	
	Signature: Dawn Lindsay	Date: 8/15/2023
	Date of Approval/Endorsement by Governing Board:	

Revised 1/2021

ANNE ARUNDEL COMMUNITY COLLEGE

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August 15, 2023

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

Dear Dr. Rai:

Anne Arundel Community College is requesting approval for substantial modifications to the Internet and Mobile Device Application Development (A.A.S.) degree (HEGIS 5199.05, CIP 11.9999). Please see the attached proposal to support this request.

Under a separate cover, a request for title change from Internet and Mobile Device Application Development (A.A.S.) (HEGIS 5199.05, CIP 11.9999) to Web and Mobile Application Development (A.A.S.) has been submitted.

If you have any questions, please contact Dr. Tanya Millner, Provost/Vice President for Learning at tcmillner@aacc.edu or (410) 777-2332.

We appreciate the Maryland Higher Education Commission's consideration of this request.

Sincerely,

Dr. Dawn Lindsay
President

cc: Tanya Millner, Ed.D., Provost/Vice President for Learning
Tina Smith, Ph.D., Associate Vice President for Learning
Lance Bowen, Ph.D., Dean, Science, Technology, and Education
Nanci Beier, M.A., Registrar
Tara Carew, M.B.A., M.Ed., Director, Financial Aid

Web and Mobile Application Development, Associate of Applied Science

A. Centrality to Institutional Mission and Planning Priorities:

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

The mission of AACC identifies teaching and learning as its primary focus and states that "With learning as its central mission, Anne Arundel Community College responds to the needs of our diverse community by offering high quality, affordable, accessible and innovative lifelong learning opportunities." Anne Arundel Community College's vision is that of "…a premier learning community that transforms lives to create an engaged and inclusive society." Anne Arundel Community College's philosophy is to "strive to embody the basic convictions of our country's democratic ideal: that individuals be given full opportunity to discover and develop their talents and interests; to pursue their unique potentials; and to achieve an intellectually, culturally, and economically satisfying relationship with society."

The proposed merging of the two areas of concentration into a single degree called Web and Mobile Application Development aligns with the college's mission by adapting to the industry needs and evolution of the field and hence continue to provide a quality education.

The field of web development has drastically changed. Websites are no longer static pages (the characteristic of Web 1.0) but instead are interactive (Web 2.0) and adaptive to the user since they provide the appropriate context (Web 3.0). The field keeps evolving and as it does so do the respective academic programs. It no longer makes sense for students to choose between web or mobile development environments since the two platforms have converged. This is reflected by our request to merge the two areas of concentration Internet and Mobile Device Software Development, A.A.S. and Internet Applications Development, A.A.S.

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

AACC is committed to helping students achieve Excellence through Innovation, which is the theme of AACC's strategic plan. Every decision is grounded in how students can be helped to achieve academic excellence and remain engaged with their own goals.

The college's strategic plan, Engagement Matters: Excellence through Innovation [1], focuses on innovation to ensure equity in college systems and practices to provide positive student and employee experiences. The college is pursuing this plan while adhering to the mission's central tenet of responding to the needs of our diverse community by offering high quality, affordable, accessible and innovative lifelong learning opportunities.

The merged area of concentrations will build on the infrastructure already established by the two existing areas of concentration and expand the pathway for students to a wide range of transfer degree opportunities and continue supporting the College's strategic goals of progress and completion.

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.)

[1] https://www.aacc.edu/media/college/leadership/AACCStrategicPlanBrochure_S23-(1).pdf

The funding required to support instructional expenses for this program currently exists in the departmental budget under the two existing areas of concentration that we propose to merge. Current administrative, faculty, and technical support is available to sustain the program for the next five years and no additional funding is required.

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

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

AACC is committed to the ongoing administrative, financial, and technical support for this program. Since the degree will fall under the Department of Computer Science, existing resources within the department already do and continue to support the degree.
Technical support will be provided by the onsite technical call center through AACC's Information Services department. AACC's IDEA Lab-Innovation, Design, Engagement, and Accessibility will provide support and maintenance of the College's learning management system (lms).

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

The proposed major modification will combine the two areas of concentration (Internet and Mobile Device Software Development, A.A.S. and Internet Applications Development, A.A.S.) into a single degree which will have increased enrollments. All college programs are assessed for viability based upon relevant content and applicability to workforce requirements along with enrollment trends. If a department decides to remove a credit program from the catalog, they take into consideration the students currently enrolled and ensure that they have ample time to complete their program.

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

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

a) The need for the advancement and evolution of knowledge:

Governor Wes Moore continues to hold higher education excellence as a top goal for his administration. More specifically:
The State of Maryland is among the nation's leaders of innovation in higher education, highly ranked in research and development with 72 federal laboratories. Some of the innovative industries and academic studies for the 21st century include artificial intelligence, bioinformatics, biotechnology, biopharma, cybersecurity, data mining, data analytics, entrepreneurship, informational technology, nanotechnology, modern manufacturing, and robotics–all supported by our higher education institutions.[2]
The proposed degree falls under the "information technology" innovative industry and academic studies. Under the Occupational Outlook Handbook[3], Web Developers and Digital Designers will see a 13% growth between 2020 and 2030 with over two hundred thousand positions nationwide.

[2] https://mhec.maryland.gov/Pages/2021-2025-Maryland-State-Plan-for-Higher-Education.aspx

[3] https://www.bls.gov/ooh/computer-and-information-technology/web-developers.htm

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

This program greatly expands the educational opportunities and choices for minority and educationally disadvantaged students at institutions of higher education.

2. Provide evidence that the perceived need is consistent with the Maryland State Plan for Postsecondary Education[4].

Goal 1: Access: AACC offerings remain an affordable and accessible option to citizens of Anne Arundel County and the surrounding area. The proposed area of concentration is an exceptionally affordable option for students. The degree program also increases access to employable skills that align with the Maryland State Plan for Postsecondary Education.

Goal 2: Success: Like all of the degree programs at AACC, this degree boasts a clear pathway for students to earn their degree. Couple that with AACC's transparent college policies, admissions and enrollment procedures, and wrap-around student support services (e.g.: Advising, library services, tutoring, Writing Center, Veteran Support Center, etc.), AACC aims to support student success in a myriad of ways and make completing this area of concentration streamlined and straight-forward.

Goal 3: Innovation: Consistent with the Maryland State Plan, AACC continues to offer innovative programs that are instructed by credentialed and experienced faculty members.

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 proposed major modification is under the Department of Computer Science and was developed for individuals that intend to specialize in the Web and Mobile software development. Prospective students may be already employed in the industry but using older technologies (career builders), may be already employed in related industries and would like to enter the field of software development (career switchers), as well as for high school graduates (career starters). At the current time, the existing areas of concentration provide an easily attainable pathway for these individuals to gain these skills and complete a college degree.
Based on the Economic Modeling (Emsi) there are currently about 14,000 unique job postings in our region.

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

Based on an employment data query through Economic Modeling (Emsi) for the State of Maryland software developers will experience a 14.8% increase from 2021 to 2026.

[4] https://mhec.maryland.gov/Pages/2021-2025-Maryland-State-Plan-for-Higher-Education.aspx

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.**

Under the Occupational Outlook Handbook[5], Web Developers and Digital Designers will see a 13% growth between 2020 and 2030 with over two hundred thousand positions nationwide.

Besides the national forecasted growth, given the Emsi data[6] the retirement risk is High:

Programmers	24% are between 45-54
	18% are between 55-64
Software Quality Assurance Analysts and Testers	20% are between 45-54
	14% are between 55-64

In addition, the job outlook according to Bureau of Labor Statistics for software developers for the period of 2020 to 2023 will exceed 22%to over two million jobs nationwide. [7]

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

Currently, although the need for Web and Mobile developers is large and it is expected to grow even higher over the next decade, only two community colleges in Maryland have similar programs (Montgomery Community College and Hagerstown Community College) and University of Maryland Global Campus together with Capitol Technology University provide a Bachelors degree. Although the anticipated need in the state is in the thousands, there are only a few hundred students in the respected programs. A large number of interested students turn to coding boot camps which vary from $5,000 to $15,000.

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.**

TABLE 1: Peer Institution Programs		
College	**Web and Mobile Application Development, A.A.S.**	**Similar Programs**
Hagerstown Community College	No	Web and Multimedia Technology, A.A.S.
Montgomery College-All Campuses	No	Digital Media and Web Technology, A.A.S.
Univ. of MD Global Campus	No	Digital Media & Web Technology, Bachelor
Capitol Technology University	No	Web Development, Certificate

Table 2: Peer Institution Curricula

[5] https://www.bls.gov/ooh/computer-and-information-technology/web-developers.htm
[6] https://commerce.maryland.gov/Documents/AppendixBMarylandMEPStrategicPlanforMarylandFinalReport.pdf
[7] https://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm

College	Program Curriculum

Anne Arundel Community College[8]	Proposed: Web and Mobile Application Development, A.A.S.
	• 18 cr. General Education
	  ○ 6 cr. English Composition
	  ○ 3 cr. Arts & Humanities Gen Ed
	  ○ 3 cr. Biological & Physical Sciences
	  ○ 3 cr. Mathematics Gen Ed
	  ○ 3 cr. Social and Behavioral Sciences
	• 31 cr. Program Requirements
	  ○ ART 170 Web Design 1 3 credit hours
	  ○ CTP 115 Intro Obj Orient Prog Anal/Dsg 4 credit hours
	  ○ CTP 118 Web Development using HTML/CSS 4 credit hours
	  ○ CTP 130 Programming in PHP/MySQL 3 credit hours
	  ○ CTP 135 Programming in JavaScript 4 credit hours
	  ○ CTP 140 Database Fundamentals, SQL/NoSQL 3 credit hours
	  ○ CTP 150 Computer Science 1 4 credit hours
	  ○ CTP 236 Advanced JavaScript 3 credit hours
	  ○ CTP 237 Server-Side Development 3 credit hours
	• 11 cr. Program Electives
	  ○ ART 268 User Experience Design for the Web 3 credit hours
	  ○ ART 269 Responsive Web Design 3 credit hours
	  ○ CTP 220 Content Management Systems 3 credit hours
	  ○ CTP 230 Android Programming 4 credit hours
	  ○ CTP 232 iPad/iPhone iOS Programming 1 4 credit hours

Hagerstown Community College[9]	○ Program Name: WEB & MULTIMEDIA TECHNOLOGY (60 credits)
	○ Program includes:
	  ▪ 3 cr. Arts/Humanities
	  ▪ 3 cr. Behavioral/Social Sciences
	  ▪ 3-4 cr. Biological/Physical Science
	  ▪ 3 cr. Diversity
	  ▪ 3 cr. English
	  ▪ 3 cr. Mathematics
	  ▪ 30 cr. Program Requirements (CSC 102 - Introduction to Information Technology (3 Credits), GDT 112 - Computer Graphics (3

[8] https://catalog.aacc.edu/index.php?catoid=25
[9] https://www.hagerstowncc.edu/academics/divisions/tcs/web

	Credits), GDT 116 - Digital Imaging (3 Credits), IST 173 - Database Fundamentals (3 Credits), STU 106 - Professionalism in the Workplace (1 Credit), WEB 101 - Web Design I (3 Credits), WEB 110 - Web Design II (3 Credits), WEB 115 - Web Developer I (3 Credits), WEB 210 - Web Developer II (3 Credits), WEB 215 - JavaScript and Multimedia (3 Credits), WEB 220 - Introduction to Content Management Systems (2 Credits)) ▪ 9 cr. Restricted Electives (BUS 101 - Introduction to Business Organization and Management (3 Credits), COM 108 - Introduction to Human Communication (3 Credits), CSC 109 - UNIX/Linux Operating System (3 Credits), CSC 132 - Introduction to C and C++ Programming (3 Credits), CSC 134 - Introduction to JAVA Programming (3 Credits), GDT 142 - Computer Illustration: Adobe Illustrator (3 Credits), GDT 146 - Graphic Design I (3 Credits), GDT 220 - Digital Video and Audio (3 Credits), IST 133 - Visual Basic (3 Credits), SDE 201 - Mobile Applications Design and Development (3 Credits), WEB 269 - Internship I (1-3 Credits)) ▪ 2-3 cr. Free Electives (ART 102 - Two-Dimensional Design (3 Credits), IST 154 - Networking Basics (3 Credits), IST 160 - Introduction to Security Fundamentals (3 Credits), MGT 104 - Marketing (3 Credits))
Montgomery College-All Campuses[10]	○ Program Name: DIGITAL MEDIA AND WEB TECHNOLOGY (60 credits) ▪ 10 cr. Foundation Courses (English Foundation 3cr., Health Foundation 1 cr., Mathematics Foundation 3cr., Speech Foundation 3cr.) ▪ 10 cr. Distribution Courses (Arts or Humanities distribution 3 cr., Behavioral and social sciences distribution 3cr. Natural sciences distribution with lab 4 cr.)) ▪ 40 cr. Program Requirements (CMSC 100 - Fundamentals of Computer Programming 2 cr., ENGL 101 - Introduction to College Writing 3 cr., TECH 272 - Professional Website Development 4 cr., TECH 273 - Advanced Professional Web Technologies 3 cr., TECH 274 - Web

[10] https://catalog.montgomerycollege.edu/preview_program.php?catoid=2&poid=348

		Content Management Systems and Strategy 3 cr., TECH 276 - JavaScript Fundamentals 3 cr., TECH 299 - Web Certificate/Degree Portfolio 3 cr., Elective 19 semester hours)

2. Provide justification for the proposed program.

This degree will provide a clear pathway for students to enter the field of software development and more specifically web and mobile development. The courses are not new to AACC since this degree is the result of the merger between two existing degrees in web as well as mobile software development. Distinguishable from similar programs at community colleges in the state, this pathway will adequately prepare students to not only transfer to a four-year institution in a wide range of majors (computer science, information systems, software development, cloud development, etc.) but also allow access and entry into the workforce in a variety of settings.

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

This degree program is designed with the intent of future transfer although it does not appear that any HBI in the State of Maryland has a major in Web and Mobile software development. However, this area of concentration meets the basic needs for any student to enter traditional computer science or software development programs at HBIs.

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

Maryland HBIs have programs in Computer Science and Software Development. AACC serves a diverse student body with increasing numbers of minority and underrepresented students. This degree program has the potential to increase the participation of underrepresented students in Computer Science and Software Development by providing a clear transfer pathway to HBIs in Computer Science programs.

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

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

The proposed merger of the two areas of concentration grew out of the guidelines and directions of the programmatic advisory board as well as extensive research into the needs of industry in this area.

The Web and Mobile Application Development program will be overseen by the Computer Science Department faculty.

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

Upon successful completion of this program, students will be able to:

1. Summarize the process of serving a webpage and how the browser renders code
2. Build front-end websites with static and dynamic Web pages
3. Create back-end server with RESTful routes to support full-stack applications

4. Implement user authentication schemes needed to incorporate different types of databases
5. Develop apps while applying the accepted best practices for software development

The assessment activities may take diverse forms including, but not limited to, standardized assessments, placement tests, faculty-developed evaluations, focus sessions, surveys, and evaluation of student work. The college believes that such input is vital to its responsibility to maintain quality instruction. Therefore, class time may be used at times for these activities, and it is expected that students will participate in the processes when asked. Confidentiality of responses is ensured.

3. Explain how the institution will:

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

Anne Arundel Community College is committed to ensuring that its students and graduates are among the best-prepared citizens and workers of the world by offering high quality, affordable, and accessible learning opportunities while also continuing the institution's excellence, accountability, and continuous learning. To this end, practices and procedures are established to ensure faculty, staff, and administrators systematically assess student learning outcomes at the course, program, and institution levels. All academic departments maintain assessment plans for their programs and courses that outline learning outcomes, curriculum mapping, assessments, and data collection cycles.

Assessments to measure student learning take many forms including exams, research papers and other written assignments, class discussions, performances, and lab exercises. These assessment items are mapped to course-level and program-level learning outcomes. Measures of student learning are aggregated to the appropriate level (course, program, institution) to provide the basis for faculty discussions on curriculum, pedagogy, and assessment. In addition to periodic program-level learning outcomes assessment, all credit degree and certificate programs are reviewed on a 4-year cycle for evidence of: program retention and completion, success in program foundational courses, enrollment, value-added, and assessment practices. Program review also include a review of program outcomes.

b) Document student achievement of learning outcomes in the program

The Computer Science as well as the Cybersecurity area document evidence of student achievement of learning outcomes on a cyclical basis in the college's assessment management system (AMS). Documentation includes learning outcomes, curriculum maps, assessment plans, findings (data and analysis), and action plans.

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

31 cr. Program Requirements

ART 170 Web Design 1

3 credit hours - Two hours of lecture and three hours of laboratory weekly; one term.
Study concepts integral to designing for the Web, including Web design history, XHTML, CSS, image preparation/optimization, site planning, FTP and design using industry standard applications. Explore the designer's role within professional, cultural, and historical contexts.

CTP 115 Introductory Object-Oriented Program Analysis and Design

4 credit hours - Four hours of lecture and directed laboratory weekly; one term.
This course meets the Technology Requirement.

Learn analysis and design problem-solving techniques to prepare for programming in any language. Learn about object-oriented design, development, and related security techniques. Analyze specifications, use design tools such as pseudocode and Unified Modeling language (UML) diagrams to develop classes and objects, consider examples of common program designs, and implement object-oriented designs in a high-level language.

CTP 118 Web Development using HTML/CSS

4 credit hours - Four hours of lecture weekly; one term.
Learn how to develop Web content for a variety of environments using Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS). Learn to format text, develop lists, create hyperlinks, construct tables, and forms on a Web document. Describe styling for the mobile Web, use of multimedia, and interactivity. Learn introductory JavaScript concepts.

CTP 130 Programming in PHP/MySQL

3 credit hours - Two hours of lecture and two hours of laboratory weekly; one term.
Use fundamental design principles and problem-solving techniques introduced in CTP 115 to develop Web applications using PHP server-side scripting language and the MySQL relational database management system. Participate in hands-on activities to learn topics that include Web application concepts and environments, PHP language structure, relational database concepts, and techniques to develop Web applications that include database management systems and user interaction.

CTP 135 Programming in JavaScript

4 credit hours - Four hours of lecture and directed laboratory weekly; one term.
Learn JavaScript and jQuery languages through lecture and hands-on directed lab activities. Develop programming skills to create interactive Web pages. Learn to manipulate the browser environment, add special effects, validate form data, and manage state information. Learn to access server-side data using AJAX.

CTP 140 Database Fundamentals, SQL/NoSQL

3 credit hours - Three hours of lecture and directed laboratory weekly; one term.
Learn database fundamentals while working with both relational (SQL) and non-relational (NoSQL) architectures. Learn to create, update, delete, and retrieve data from a traditional relational database using SQL as well as non-relational databases using NoSQL.

CTP 150 Computer Science 1

4 credit hours - Three hours of lecture and two hours of laboratory weekly; one term.
Use fundamental design principles and problem-solving techniques introduced in CTP 115 to develop computer algorithms. Implement algorithms as programs coded in Java, an object-oriented programming language. Learn the data types, control structures, classes, arrays, and I/O in the Java programming language. Learn graphical user interfaces, inheritance, polymorphism, recursion, and exceptions. Emphasize style, documentation, solution robustness, and conformance with specifications throughout course work.

CTP 236 Advanced JavaScript

3 credit hours - Three hours of lecture and directed laboratory weekly; one term.
Learn advanced JavaScript skills through lecture and hands-on lab activities. Use a JavaScript framework such as React to create dynamic web pages that interact with a

web server.

CTP 237 Server-Side Development
3 credit hours — Three hours of lecture and directed laboratory weekly; one term.
Learn the fundamentals of back-end application development to create server-side web applications and services. Build server-side Application Program Interfaces (API) which respond to requests, authenticate users, and interact with data in a database.

11 cr. Program Electives

ART 268 User Experience Design for the Web
3 credit hours - Two hours of lecture and two hours of lab weekly; one term.
Learn the process of creating a successful website through effective information architecture, research, strategy, and prototyping. Create wireframes, sitemaps, and other industry deliverables that communicate the business goals and user needs of a website. Develop and conduct usability studies to measure the performance of websites.

ART 269 Responsive Web Design
3 credit hours - Two hours of lecture and two hours of laboratory weekly; one term.
Learn the process of planning, designing, and building of responsive websites including project planning and wireframing, creation of mood boards and design comps. Create websites using responsive frameworks, incorporating multi-sized graphics and adaptive content, across desktop, tablet, and mobile devices.

CTP 220 Content Management Systems
3 credit hours - Two hours of lecture and two hours of laboratory weekly; one term.
Learn to plan and design websites using popular content management systems (CMS) such as WordPress, Drupal, or Joomla. Use development skills in PHP to add functionality to web sites.

CTP 230 Android Programming
4 credit hours - Three hours of lecture and two hours of laboratory weekly; one term.
Learn to develop applications for the Google Android platform. Use object-oriented programming techniques to design and create mobile applications for Android devices. Utilize the Android development environment and work with the Android user interface, data persistence, content providers, messaging, networking, and services.
-10

CTP 232 iPad/iPhone iOS Programming 1
4 credit hours - Four hours of lecture and directed laboratory weekly; one term.
Learn the fundamental technologies to develop applications for iOS devices such as the iPhone and the iPad through directed lab activities. Learn the fundamental activities involved in using the XCode development environment, Interface Builder and Cocoa Touch to analyze, develop, test and deploy working applications for the iOS environment.

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

The proposed degree meets the college's general education requirements of 24 credits, which includes a three-credit course that is approved to meet the college's diversity requirement. Previous successfully completed college work may be applied to general education requirements, where applicable.

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.**
   Not Applicable

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.**

AACC provides all students with clear, complete, and timely information on the curriculum, course, and degree requirements, nature of faculty/student interactions, 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.

Anne Arundel Community College ensures accuracy of program presentation in advertising, recruiting and admissions materials by using procedural processes through a connected curriculum/catalog software system where content managers and the college catalog editor review and update in a collegial partnership with our Strategic Communications (Marketing) department. If this program is approved, the catalog will present clear and accurate curricular information to include course and degree requirements, available course formats and information about technology assumptions about competency, equipment requirements, and the learning management system.

Each student also receives a course syllabus from their instructor that outlines the course content to be covered and the nature of faculty/student interactions as appropriate for that course and course format. For online courses or courses with an online component, students are made aware about assumptions of technology competence and skills, technical equipment requirements, and the College is learning management system (Canvas). This information for each course may be provided via the course syllabus or directly by the instructor during the first few class sessions.

In addition, each new student is encouraged to attend an orientation session, either online or in person. Orientation offers an introduction to all the various aspects of academic and campus life at AACC. Students learn tips for academic success, hear a variety of AACC student success stories, learn more about MyAACC, the student portal, meet faculty members, join a student organization, meet fellow students, and take a campus tour.

Students have access to the complete range of services available at AACC in support of achieving their educational goals.[11] The college website, catalog[12], and a myriad of other materials outline the comprehensive services available to students: Academic Services, Student Records, Campus Amenities, Careers & Employment, Disability Support Services, Health & Personal Counseling Services, Student Achievement & Success, and Technology.

The majority of AACC credit students receive some form of financial aid, scholarships, or financial support. AACC's Financial Aid & Veterans Benefits office[13] provides financial assistance to students and families, allowing them to participate fully in the total educational experience. More information

[11] https://www.aacc.edu/resources/
[12] https://catalog.aacc.edu/
[13] https://www.aacc.edu/about/administrative-offices/financial-aid/

on how to apply for scholarships and grants is found on the college website[14], as is information on tuition, fees, and methods of payment.[15]

All admissions and outreach materials are the same for all students, and accurately represent programs and services available. Notice of nondiscrimination and information on Title IX, ADA, and Title 504 contacts are provided.

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.

Anne Arundel Community College ensures accuracy of program presentation in advertising, recruiting, and admissions materials by using procedural processes through a connected curriculum/catalog software system where content managers and the college catalog editor review and update in a collegial partnership with Strategic Communications. Anne Arundel Community College's homepage has links to six major headings, two of which directly apply to college majors and credit courses (earn a degree, certificate, or college credits, and earn college credits while in high school). The main page for each heading has relevant advertising, recruiting and admissions information. In addition, across the side of every page are direct links to Programs & Courses, Apply & Register, Costs & Paying for College, and Resources for Students, Campus Life & Activities, and About Us.

H. Adequacy of Articulation

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

This degree is an A.A.S. degree and has no direct equivalent at any 4-year institution.

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 faulty member will teach (in this program).

This degree program utilizes courses and faculty members already in place. The Department of Computer Science at AACC currently employs seven full-time faculty. The majority of our courses are taught by the full-time members. Below please find a list of all faculty currently teaching in this program.

TABLE 3: Faculty Resources

Name	Terminal Degree, Title and Field	Academic Title	Status	Courses
Krysten Hall	MA - Instructional Systems Development	Associate Professor	Full-time	CTP-103 CTP-150 CTP-194 CTP-250 CTP-275
Wendy Chasser	Master's Degree in Business Administration	Assistant Professor	Full-time	CTP-115 CTP-150 CTP-200

[14] https://www.aacc.edu/costs-and-paying/credit-costs-and-payment/financial-aid-and-scholarships/
[15] https://www.aacc.edu/costs-and-paying/credit-costs-and-payment/credit-tuition-and-fees/

Cheryl Heemstra	Master of Business Administration	Professor	Full-time	CTA-111 CTA-116 CTP-103
Ruimin Hu	D. SC. in Information Technology, Towson University	Associate Professor	Full-time	CTP-130 CTP-136 CTP-145 CTP-150 CTP-250
Xi Kramer	Masters of Science	Assistant Professor	Full-time	CTP-103 CTP-115 CTP-160

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

Anne Arundel Community College provides professional development for faculty in pedagogy that includes student-centered, content focused, evidenced-based effective teaching practices that improve student learning. Competency-based faculty professional development learning opportunities occur in a variety of formats including face-to-face workshops, online and hybrid courses, focused signature series programs, and department specific mini workshops. These opportunities are facilitated by internal teaching faculty and expert consultants. A menu of focused faculty development programs aligned to the priorities for the Division of Learning to include a focus on teaching effectiveness and pedagogy is provided yearly. Faculty may select from these signature programs for their required professional development plans.

Anne Arundel Community College faculty development is designed to deepen the faculty member's understanding of concepts, skills, and teaching strategies that lead to substantial learning experiences for students. Faculty content experts engage in professional development opportunities focused on understanding and applying a learner-centered approach to college teaching linking theory to practice. Structures and strategies necessary for student learning of challenging content, critical thinking, and collaboration are taught to faculty utilizing adult learning theory and incorporating active learning. Faculty are provided with formal and informal opportunities to collaborate with colleagues and learn in job-embedded contexts for discipline/course specific content instruction. Faculty are supported in expanding their instructional practices through these formal professional development opportunities and through colleague-to-colleague professional development including learning structures such as mentoring, coaching, teaching squares, book studies, and colleague to colleague observation and feedback. In addition, supervisors routinely provide opportunities for feedback and reflection.

b) The learning management system

All full and part-time faculty teaching online or hybrid courses must complete Focus on Facilitation, which provides online faculty an introduction to Canvas, an understanding of teaching online and best practices in course design, facilitation, and technology integration. Online Focus-Applied, which is currently integrated into a stimulus fund project called Resiliency Awards, provides online faculty an opportunity to build or substantially improve an online or hybrid course utilizing best practices in course design and quality standards. Separate training is also available for faculty only using the learning management system for teaching in a face-to-face mode. In all

of these trainings, instruction regarding online pedagogy is both provided and modeled. An emphasis is placed on strategies that facilitate communication, develop higher order thinking and problem-solving skills, and engage learners in the online environment. Clear navigation, explicit instructions, accessibility, and format of appropriate assessments are presented and discussed. Lectures for all didactic courses are placed online through the Canvas system.

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

Faculty content developers will work in collaboration with instructional designers to develop online courses that adhere to institutional course design best practices as informed by the essential standards for course design. Additionally, trainings, presentations, demonstrations, and model courses are available to faculty regarding evidenced-based best practices for distance education. In addition, all faculty members, both full and part-time, who will be teaching hybrid or online sections, enroll in and must pass Focus on Facilitation. Online Focus is a semester-length online course building process emphasizing educational practices and best practices in course design offered by the college's IDEA Lab.

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

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

The college's Andrew G. Truxal Library has a collection of over 148,000 books, 150 print periodicals, 560 CDs, 2,650 DVDs and 65 online databases offering access to more than 15,000 electronic journals and magazines, 35,000 electronic books, hundreds of thousands of digital images and hours of streaming video and audio. The library provides access to the Internet for educational research purposes. All textbooks used in the proposed curriculum are available in the library for students to use. The textbooks will be available both to be checked out and in the reference section. Resources are periodically reviewed for current content and availability. Library staff were consulted during the program development phase and determined that adequate resources are available for the students in the proposed program.

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. If the program is to be implemented within existing institutional resources, include a supportive statement by the President for adequate equipment and facilities to meet the program's needs.

The proposed degree program will be implemented using existing institutional resources which are adequate to meet the program's needs. No new facilities or resources will be required.

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,

AACC provides all students with a student college email address. In addition, there is an electronic mailing system within the Canvas learning management system. Canvas is a robust and

comprehensive learning management system that features tools for group discussions as well as private email communication with the instructor and among students. Additionally, they may use any of the other Canvas features such as posting announcements and discussion boards.

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

AACC has an easy-to-use learning management system, Canvas, which students can either learn on their own, virtually attend Canvas online training, or receive help from the helpdesk or instructors. The helpdesk (410-777-HELP) that is available during the week and on weekends. There are also computers in the Truxal Library for student use. Canvas provides the necessary technological support that this certificate needs. All courses have a Canvas course shell in which faculty are required to post their syllabus and to use the Canvas gradebook. Additionally, they may use any of the other Canvas features such as posting announcements and discussion boards. It also features an accessible online gradebook that all instructors are required to use and update regularly. Assignments can be assessed directly in Canvas using easily accessible tools for providing and viewing instructor feedback.

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 – RESOURCES					
Resource Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1. Reallocated Funds	$0	$0	$0	$0	$0
2. Tuition/Fee Revenue (c + g below)	$56,250	$73,440	$107,640	$143,100	$206,550
a. Number of F/T Students	10	12	18	25	35
b. Annual Tuition/Fee Rate	$45,000	$55,080	$84,240	$119,250	$170,100
c. Total F/T Revenue (a x b)					
d. Number of P/T Students	5	8	10	10	15
e. Credit Hour Rate	$150	$153	$156	$159	$162
f. Annual Credit Hour Rate	15	15	15	15	15
g. Total P/T Revenue (d x e x f)	**$11,250**	**$18,360**	**$23,400**	**$23,850**	**$36,450**
3. Grants, Contracts & Other External Sources	$0	$0	$0	$0	$0
4. Other Sources	$0	$0	$0	$0	$0
TOTAL (Add 1 – 4)	**$56,250**	**$73,440**	**$107,640**	**$143,100**	**$206,550**

Financial Data – Resources

1. **Reallocated Funds:** None
2. **Tuition and Fee Revenue:** Tuition & Fees are estimated to increase by 2% each year.
3. **Grants and Contracts:** None
4. **Other Sources:** None
5. **Total Year:** None

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.

Note: The students will be enrolled in existing open enrollment course sections offered in the Computer Science credit degree programs. The college anticipates no additional expenditures.

TABLE 2 - EXPENDITURES					
Expenditure Categories	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
1. Faculty (b+c below)	$0	$0	$12,512	$12,762	$13,017
a. # FTE	$0	$0	0.40	0.40	0.40
b. Total Salary	$0	$0	$11,623	$11,855	$12,092
c. Total Benefits	$0	$0	$889	$907	$925
2. Admin. Staff (b + c below)	$0	$0	$0	$0	$0
a. # FTE	$0	$0	$0	$0	$0
b. Total Salary	$0	$0	$0	$0	$0
c. Total Benefits	$0	$0	$0	$0	$0
3. Support Staff (b + c below)	$0	$0	$0	$0	$0
a. # FTE	$0	$0	$0	$0	$0
b. Total Salary	$0	$0	$0	$0	$0
c. Total Benefits	$0	$0	$0	$0	$0
4. Equipment	$0	$0	$0	$0	$0
5. Library	$0	$0	$0	$0	$0
6. New or Renovated Space	$0	$0	$0	$0	$0
7. Other Expenses	$0	$0	$0	$0	$0
TOTAL (Add 1 – 7)	$0	$0	**$12,512**	**$12,762**	**$13,017**

Financial Data – Expenditures

1. Faculty Funds: We anticipate the need to allocate existing funds to support .4 FTE in adjunct pay to support ongoing instruction needs for the proposed program.
2. Administrative Staff Funds: None.
3. Supportive Staff Funds: None**.**
4. Equipment: None
5. Library: None.
6. New or Renovated Spaces: None.
7. Other Expenses: None

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.**

All courses and faculty at AACC are evaluated by students using the online Student Opinion Forms (SOFs) at the conclusion of each semester. These forms have standard Likert questions with opportunities for anecdotal feedback. Students are also given the opportunity to leave comments in some of the criteria and to render a

summary judgment of the course and teaching faculty. All faculty are evaluated each academic year based on the college's evaluation form which includes a review of student opinion form data. Student opinion form data is also reviewed and evaluated during the faculty promotion and tenure processes. In addition to soliciting student input for faculty and course evaluation, faculty colleagues conduct classroom visitations and peer evaluations in the second and fifth year of employment and at any time of consideration for promotion or tenure for full-time faculty. Adjunct faculty are evaluated by a peer or supervisor in the first year of employment and every three years thereafter and/or at the time of consideration of promotion. Student learning outcomes will be assessed by evaluating data collected via the Canvas Learning Platform data collection tool. Data will be collected from a number of assessment sources, including essays, exams, and quizzes. Faculty will compare global achievement levels with the current set of student learning outcomes to determine the utility and effectiveness of the learning outcomes. This procedure leaves open the possibility of future adjustment to ensure that these outcomes drive optimal classroom instruction and yield useful data.

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.**

The College has an established Office of Assessment and Instructional Innovation. The Director of Assessment and Instructional Innovation meets regularly with a faculty-run subcommittee on Learning Outcomes Assessment, a sub-committee of the Teaching and Learning Committee. The mission of the subcommittee on Learning Outcomes Assessment is to guide and oversee program-level outcomes assessment throughout the college. The Office of Assessment and Instructional Innovation provides tools to the college's various programs to assist in regular program assessment, including an Annual Program/Department Assessment Report and a Curriculum Mapping Template to ensure alignment of course objectives and outcomes with department and/or program outcomes as well as college-level core competencies.

AACC has the EPC committee, designed to evaluate the addition or modification of new programs, and deletion of existing programs. EPC makes recommendations to the Academic Forum/Council of the college since it is charged with evaluating existing and proposed curricula and courses so that they support educational objectives and policies and comply with established requirements from accrediting and other approving agencies. The proposed program was reviewed and approved by EPC, the Academic Forum/Council as well as the College's Board of Trustees.

The college conducts regular evaluations of degree programs with respect to enrollment, retention, curriculum relevancy, and outcomes assessment. All programs undergo a comprehensive review on a staggered 4-year cycle, using a Comprehensive Program Review Template that contains program data scored on a rubric. The template includes metrics in the areas of program continuation and completion, course success, headcount and program outcomes assessment. Also required is completion of a Program Review Narrative, which includes action items. The entire package is then reviewed in meetings that include the program chair/director, Assistant Dean, Director of Assessment and Instructional Innovation, Dean, Associate Vice President for Learning & Academic Affairs (AVPL), and the Provost/Vice President for Learning. The purpose of the program review meeting is to share program successes and address program needs. To ensure progress is being made on action items, the Office of the AVPL requires the Deans to complete two-year interim reports. Program review meetings and discussions also include consideration of programs costs and return on investment to address cost effectiveness and the impact on student and community needs. Each year the program's progress is evaluated in the Assessment of Outcomes and Educational Effectiveness Plan. In addition, National exam pass rates are also evaluated during this process.

Student satisfaction with courses and instruction is assessed for each course and instructor each semester through the collection of feedback through student opinion forms. Through student opinion forms, students can

assess and comment on the course content, delivery, and instruction. This information is used for faculty evaluation and considerations for promotion and tenure.

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.

A key feature of AACC's mission and strategic planning involves respecting, valuing and achieving diversity. AACC's Diversity Statement[16] asserts that AACC is committed to supporting and sustaining a diverse and inclusive educational environment. Diversity is not merely a goal, but a value that is embedded throughout the institution in multiple areas including, but not limited to, learning, teaching, student development, institutional functioning, and engagement in partnerships with the local and global community. In addition, the elements of the proposed program strongly align with the college's strategic plan in support of academic excellence in using "... high-quality educational practices and learning to eradicate systemic inequalities." [4]

The proposed program is well positioned to increase access to minority and diverse student populations to career opportunities and advancement in a variety of fields. The goals of the proposed program include providing diverse students access to high quality curricula, instruction and educational experiences while ensuring equity of course and program outcomes through periodic and comprehensive program assessment as discussed above.

This proposed degree program greatly expands the educational opportunities and choices for minority and educationally disadvantaged students at institutions of higher education. The students because of their socioeconomic standing, that initially chose an apprenticeship or other workforce certification program that allowed them to earn a living while attaining education, training and an industry certification, may now complete an associate's degree.

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.

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.

Anne Arundel Community College has been approved to offer one or more degree or certificate/diploma programs for which students could meet 50% or more of their requirements by taking distance education courses by Middle States Commission on Higher Education. AACC utilizes the Canvas platform to provide online lectures to students. In addition, the college has distance education classrooms equipped with cameras and audio to share lectures with students in offsite facilities.

[16] https://www.aacc.edu/about/diversity-and-inclusivity/

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

   Not applicable.

References

1. Anne Arundel Community College Strategic Plan FY 2017-20 (2016) Retrieved from: http://www.aacc.edu/media/college/leadership/StrategicPlanBrochure_F16_WEB.pdf

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3. 2017-2021 Maryland State Plan for Postsecondary Education FY Retrieved from: https://mhec.state.md.us/About/Pages/2017StatePlanforPostsecondaryEducation.aspx

4. Maryland Apprenticeship and Training Council's 2017 Annual Report Retrieved from: https://www.dllr.state.md.us/employment/appr/apprannreport.pdf

5. Anne Arundel Community College Online Catalog (2019-2020) Retrieved from: https://catalog.aacc.edu/index.php?catoid=25

6. Resources for Students (2019) Retrieved from: https://www.aacc.edu/resources/

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8. Financial Aid and Veterans Benefits (2019) Retrieved from: https://www.aacc.edu/about/administrative-offices/financial-aid/

9. Financial Aid and Scholarships (2019) Retrieved from: https://www.aacc.edu/costs-and-paying/credit-costs-and-payment/financial-aid-and-scholarships/

10. Credit Tuition and Fees (2019) Retrieved from: https://www.aacc.edu/costs-and-paying/credit-costs-and-payment/credit-tuition-and-fees/

11. AACC's Diversity Statement Retrieved from: https://www.aacc.edu/about/diversity-and-inclusivity/

ANNE ARUNDEL COMMUNITY COLLEGE

Internet and Mobile Device Application Development, A.A.S
Comparison Chart 2022-23

Internet and Mobile Device Application Development (A.A.S) 2 AOC's: Mobile Device Application Development and Internet Application Development 2021-2022		**Web and Mobile Application Development (A.A.S.) 2022-23**	
Current Courses	**Credit**	**Proposed Courses**	**Credit**
General Education	**21**	**General Education**	**18**
English ENG 101-102 *ENG 101A and ENG 101 are equivalent courses. Students may take ENG 101A-ENG 102 or ENG 101-ENG 102 to meet their English Composition General Education requirement.*	6	English ENG 101-102 *ENG 101A and ENG 101 are equivalent courses. Students may take ENG 101A-ENG 102 or ENG 101-ENG 102 to meet their English Composition General Education requirement.*	6
Arts and Humanities	3	Arts and Humanities	3
Biological and Physical Sciences BIO 135 – Principles of Nutrition	3	Biological and Physical Sciences BIO 135 – Principles of Nutrition	3
Mathematics MAT 145 – Precalculus 1	3	Mathematics MAT 145 – Precalculus 1	3
Social and Behavioral Sciences	3	Social and Behavioral Sciences	3
Additional General Education Requirements: Wellness Requirement Met by BIO 135 above		Additional General Education Requirements: Wellness Requirement Met by BIO 135 above	
Additional General Education Requirement: Technology Requirement CTP 103	3	Additional General Education Requirement: Technology Requirement Met by CTP 115 below	
Mobile Device Application Development Program Requirements: CTP 115 – Introductory Object-Oriented Program Analysis and Design	**19** 4	**Program Requirements:** CTP 115 – Introductory Object-Oriented Program Analysis and Design CTP 118 – Web Development using HTML/CSS	**31** 4 4

Internet and Mobile Device Application Development (A.A.S) 2 AOC's: Mobile Device Application Development and Internet Application Development 2021-2022		**Web and Mobile Application Development (A.A.S.) 2022-23**	
Current Courses	**Credit**	**Proposed Courses**	**Credit**
CTP 118 – Web Development using HTML/CSS	4	CTP 130 – Programming in PHP/MySQL	3
CTP 135 – Programming in JavaScript	4	CTP 135 – Programming in JavaScript	4
CTP 150 – Computer Science 1	4	CTP 140 – Database Fundamentals	3
CTP 220 – Content Management Systems.	3	CTP 150 – Computer Science 1	4
Internet Application Development Program Requirements:	**16**	ART 170 – Web Design 1 CTP 236 – Advanced JavaScript	3 3
CTP 115 – Introductory Object-Oriented Program Analysis and Design	4	CTP 237 – Node.js	3
CTP 118 – Web Development using HTML/CSS	4		
CTP 135 – Programming in JavaScript	4		
CTP 150 – Computer Science 1	4		
Mobile Device Application Development Area of Concentration Requirements:	**20**	**Program Electives:** Students must complete a minimum of 10 credit hours from the following list with a grade of C or better. One hour of general electives may be taken to meet the 60 hours required for graduation.	**11**
ART 268 – User Experience Design	3		
CTP 230 – Android Programming	4		
CTP 232 – iPad/iPhone iOS Programming 1	4		
Electives	9		
Internet Application Development Area of Concentration Requirements:	**23**	CTP 220 – Content Management Systems CTP 230 – Android Programming	3 4
ART 170 – Web Design 1	3	CTP 232 – iPad/iPhone iOS Programming 1	4
ART 268 – User Experience Design	3	ART 268 – User Experience Design	3
CTP 130 – Programming in PHP/MySQL	3	ART 269 – Responsive Web Design	3
CTP 136 – jQuery	4		
CTP 220 – Content Management Systems.	3		
CTP 236 – Advanced JavaScript	3		
Total	**60**	Total	**60**
Mobile Device Application Development Area of Concentration Program Outcomes		**Program Outcomes** Upon successful completion of the Web and Mobile Application Development degree, students will be able to:	

Internet and Mobile Device Application Development (A.A.S) 2 AOC's: Mobile Device Application Development and Internet Application Development 2021-2022		Web and Mobile Application Development (A.A.S.) 2022-23	
Current Courses	**Credit**	**Proposed Courses**	**Credit**
Upon successful completion of this program, students will be able to: 1. Develop applications for the iPad and iPhone using the iOS development environment. 2. Develop applications for Android devices 3. Demonstrate the use of design patterns 4. Apply fundamental principles and methods of Computer Science to a wide range of applications **Internet Application Development Area of Concentration Program Outcomes** Upon successful completion of the Internet Applications Development Area of Concentration, students will be able to: 1. Use HTML/CSS to create web pages 2. Use JavaScript to create web pages 3. Use jQuery to manipulate HTML DOM (Document Object Model) 4. Use PHP to enhance web pages with user activity		1. Summarize the process of serving a webpage and how the browser renders code 2. Build front-end websites with static and dynamic Web pages 3. Create back-end server with RESTful routes to support full-stack applications 4. Implement user authentication schemes needed to incorporate different types of databases 5. Develop apps while applying the accepted best practices for software development	