Frederick Community College

January 28, 2016

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

Dear Dr. Fielder,

Frederick Community College (FCC) is requesting MHEC approval of the following programs:

A.A.S. Degree:	**Game and Simulation Development**	**$850**
Lower Division Certificate:	**Computer Animation Certificate**	**$250**
Lower Division Certificate:	**Game Programing Certificate**	**$250**

The proposed **Associate of Applied Science in Game and Simulation Development** is designed to prepare students for a career in the interactive technology capacities, such as Multimedia Artist, Visual Efforts Artist, Interactive Content Designer, Interactive Media Designer, Digital Animator, Graphic Designer, Modeling & Simulation Engineer, Simulation Application Developer, Web Developer, Game Designer, Game Developer, and Application Programmer. The proposed program introduces students to the current animation and modeling software; trains students with interactive 3D technology, and prepares students' proficiency in programming languages, including Java, C++, C#, and Python. Students can also transfer to a 4-year institution to pursue their bachelor degree in Multimedia & Web Technology, bachelor degree in Computer Animation & Simulation, or bachelor degree in Computer Science with the Game Development concentration.

The **Computer Animation Certificate** falls under the A.A.S., Game and Simulation Development. It introduces students to the current animation and modeling software, such as Blender, Autodesk 3ds Max, and Autodesk Maya, and covers animation production, computer graphics, interactive 3D foundations, and 3D modeling & animation. The proposed certificate will prepare graduates to become contributing information technology professionals in the fields of Digital Graphic Designers, Multimedia Designers, Digital Animators, Character Riggers, or Web Designers/Developers.

The **Game Programming Certificate** falls under the A.A.S., Game and Simulation Development. It prepares students to develop interactive computer games on the Internet, mobile computers, and personal computers by requiring students to complete five (5) programming courses relevant to the development of computer games. This certificate will target students who wish to obtain the skills necessary to develop computer games using programming languages such as Java, C++, C#, and Python.

At this time, FCC would also ask that the A.A.S., Game and Simulation Development, Computer Animation Certificate, and Game Programming Certificate be added to MSDE's List A.

A check for administrative costs in the amount of $1,350 is enclosed. The MHEC proposals with a copy of this letter will be transmitted electronically to MHEC.

Thank you for your consideration of these proposals. If you have any questions regarding FCC's request for approval, please do not hesitate to call me at 301-846-2491.

Sincerely,
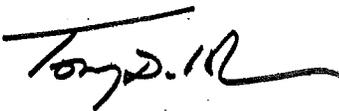
Dr. Tony D. Hawkins
Provost/Vice President for Academic Affairs
thawkins@frederick.edu

pc: Mary Sciré, FCC (mscire@frederick.edu)
        Karen Wilson, FCC (kwilson@frederick.edu)

Proposal for New Instructional Program

Frederick Community College
Frederick, Maryland 21702

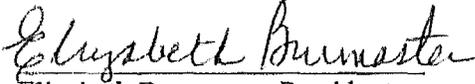Computer Animation Certificate (Career)

HEGIS CODE:
CIP CODE:

Department in which Program will be located: Computing and Business Technology

Name of Department Head: Karen A. Wilson, Ph.D.

Award to be offered: Certificate

President/Chief Executive Approval: *Elizabeth Burmaster*
Elizabeth Burmaster, President

Date of President/Chief Executive Approval: _____

Date Endorsed by Board of Trustees   1 | 20 | 2016

Date Received by Secretary of Higher Education   _____

1. **Rationale and Need for the Program**

   A. **Describe the extent to which this program is central to the institutional mission, the planning priorities of the campus, and the relationship to the instructional program emphasis.**

   The Computer Animation Certificate proposed by Frederick Community College (FCC) falls under A.A.S., Game and Simulation Development. It introduces students to the current animation and modeling software, such as Blender, Autodesk 3ds Max, and Autodesk Maya, and covers animation production, computer graphics, interactive 3D foundations, and 3D modeling & animation.

   This proposed certificate directly supports the mission of Frederick Community College (FCC) and prepares students for workforce preparation and career development. This new certificate contributes to one of FCC's goals – To provide learning opportunities based on students goals, needs for lifelong learning and participation in society. This certificate prepares graduates to become contributing information technology professionals in the areas of Digital Graphic Designers, Multimedia Designers, Digital Animators, Character Riggers, or Web Designers/Developers. Course delivery will be in flexible forms, including traditional face-to-face, hybrid, and online. It meets FCC's primary instructional objective – "To deliver flexible programs and services".

   B. **Describe how this program meets a critical and compelling regional or statewide need as described in the Maryland state plan.**

Bureau of Labor Statics (BLS, http://www.bls.gov/) of U.S. Department of Labor, reports the following facts, relevant to careers that the Computer Animation Certificate prepares for.

Quick Facts: Web Developers	
2012 Median Pay	$62,500 per year $30.05 per hour
Entry-Level Education	Associate's degree
Work Experience in a Related Occupation	None
On-the-job Training	None
Number of Jobs, 2012	141,400
Job Outlook, 2012-22	20% (Faster than average)
Employment Change, 2012-22	28,500

Quick Facts: Multimedia Artists and Animators	
2012 Median Pay	$61,370 per year $29.50 per hour
Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	None
On-the-job Training	Moderate-term on-the-job training
Number of Jobs, 2012	68,900
Job Outlook, 2012-22	6% (Slower than average)
Employment Change, 2012-22	4,300

Quick Facts: Graphic Designers	
2012 Median Pay	$44,150 per year $21.22 per hour
Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	None
On-the-job Training	None
Number of Jobs, 2012	259,500
Job Outlook, 2012-22	7% (Slower than average)
Employment Change, 2012-22	17,400

C. State the specific local, state, and/or national needs for graduates of the proposed program. Describe job opportunities that are available to persons who complete the program. Provide evidence of market demand through supporting data including results of a survey which has recently been conducted. Present data showing the current and projected supply of graduates from existing programs in the state, if any.

Shown below are search results from indeed.com (www.indeed.com) on Maryland job opportunities that Computer Animation certificate graduates are prepared for.

Web Developer   Maryland   **Find Jobs**

Jobs 1 to 10 of 2,517

Web Designer	Maryland	Find Jobs
		Jobs 1 to 10 of 509

Graphic Designer	Maryland	Find Jobs
		Jobs 1 to 10 of 293

Animation	Maryland	Find Jobs
		Jobs 1 to 10 of 148

D. Provide evidence of student interest in the program. What are the projections of program majors full-time and part-time for each of the first five years of the program?

The Computer and Information Sciences (CIS) program manager has been receiving inquiries on a regular basis from current and perspective students about the necessary training related to computer animation. These inquiries shared by full-time and part-time students in the ratio of 50/50.

E. Project the number of graduates for the first five years of the program following the first year of awarding the degree/certificate.

The proposed program is expected to have an average of 15 graduates annually, following the initial year of implementation. Students are expect to complete this certificate in two (2) semesters.

F. If a similar program exists in the state, describe the similarities or differences in the degree/certificate to be awarded, the areas of specialization, and the specific academic content of the program or course of study.

The table below shows the similar programs currently offered by community colleges in Maryland. **Digital Animation, A.A.S.**, by Montgomery College is anticipated to be completed in two (2) years; whereas **Animation/Screen-Based Design certificate** by Prince George's Community College takes two (2) full-time semesters to complete. The 18-credit **Computer Animation** certificate proposed by FCC can be completed in one (1) full-time semester or two (2) part-time semesters, and falls under FCC's Game & Simulation Development A.A.S. program.

College	Program Information
Montgomery College	Digital Animation, A.A.S. (60 credits)
Prince George's Community College	Animation/Screen-Based Design Certificate (30 credits)

2. Course of Study Leading to the Proposed Degree/Certificate

A. State the educational objectives of the program.

After completing the required courses for this certificate, students will be able to:
- Gain computer modeling and animation knowledge and skills
- Describe the process of visualizing concepts into digital artwork or animation
- Obtain the necessary training to become a digital graphic designer, animator, multimedia designer, or web designer
- Create artwork/image/animation using tools, such as design software, modeling software, animation applications, graphics design applications, and game engines
- Generate animation to be used in application, such as video games, advertising, web application, film special efforts, simulation, medical imaging, and information visualization

B. Describe the program as it would appear in a catalog, including each area of concentration.

Introduces students to the current animation and modeling software, such as Blender, Autodesk 3ds Max, and Autodesk Maya. This certificate covers animation production, computer graphics, interactive 3D foundations, and 3D modeling & animation. Students will learn the skills necessary to work as Digital Graphic Designers, Multimedia Designers, Digital Animators, Character Riggers, or Web Designers.

C. List the course (title, number, semester credit hours, and catalog description) that would constitute the requirements and other components of the proposed program. Indicate which are currently offered and which will be the new (indicate new courses with an X).

Course #	Course Title	Credit
CIS 106	Object Design & Programming	3
CIS 175	Game Theory & Design	3
CIS 176	Game Creation	3
CIS 177	Interactive 3D Technology	3
CIS 178	3D Modeling & Animation	3

Complete 1 course from:
  CAD 101 Introduction to AutoCAD I
  CMM 111 Communications Graphics I
  CIS 101 Information Systems & Technology
  CIS 140 Java Programming
  CIS 208 C++ Programming
  CIS 226 Game Scripting
		3

Course #	Course Title	Credit
	Total	18

Catalog Description of Supporting Courses:

CIS 106 Object Design and Programming (3)
Covers college-level communications skills, critical thinking skills, basics of object-oriented programming, fundamentals of computer information systems, impact of information technology on the economic, political and cultural development of society as well as the ethical, societal, and legal aspects of information technology. This course introduces object-oriented design and programming skills using a language that supports the object-oriented paradigm. This course emphasizes software engineering principles and best practices. Students will design, implement, document, and debug object-oriented programs to solve problems by utilizing various data types and algorithms, control structures, encapsulation, and inheritance. Students will practice critical thinking and communications skills by participating in structured walkthroughs and discussions, creating Unified Modeling Language (UML) diagrams in designing solutions, and debugging errors within the designed solutions. This course requires no prior programming knowledge or experience.

CIS 175 Game Theory and Design (3)
Covers game theory and design. Topics include the roles of game designers, game structures and elements as well as game development stages and methods. Students learn about designing, prototyping, and playtesting games.

CIS 176 Game Creation (3)
This course covers the creation of basic games. This hands-on course guides students step by step through the basics of building interactive games. Students learn to create computer games utilizing current technologies, such as web page design/development languages, animation/simulation software, and game engines.

CIS 177 Interactive 3D Technology (3)
Surveys the current 3 dimensional (3D) technologies and introduces the design and creation of virtual interactive 3D models. Covered techniques include mesh modeling, texturing, lighting, animation, and rendering. Students learn to design and develop computer generated interactive 3D worlds, using 3D production tools, such as Blender.

CIS 178 3D Modeling and Animation (3)
Introduces fundamentals of creating and animating 3 dimensional (3D) computer modeling. The industry standard 3D modeling and animation software are surveyed and explored. This course covers Autodesk Maya Certified Professional exam topics and objectives. Topics include 3D modeling concepts and 3D animation process. Students learn to create and animate 3D models using 3D modeling tools.

CAD 101–Introduction to AutoCAD I (3)
Introduces AutoCAD software and its application as a drawing tool. Students will utilize basic AutoCAD commands to create two-dimensional production and architectural drawings. Students will use templates, layer control, dimensioning, editing, text, symbol creation, and blocks to create and

modify geometrical designs and print/plot drawings for presentation.

CMM 111–Communications Graphics I (3)
Level one graphic design. Prepares the student for the print graphic design field through the use of the computer. The student will be introduced to design vocabulary, methods and technology through lecture, examples and hands-on project work. Emphasizes Adobe Illustrator, Adobe Photoshop, and Adobe InDesign.

CIS 101 Information Systems & Technology (3)
Explores the fundamentals of information systems and relevant technologies. This course surveys the terminologies, types, components, functions, architectures, and development life cycle of information systems. Topics include roles, values, impacts, applications, security concerns, social issues, ethics, and responsibilities related to the use of information systems in businesses. Students also learn productivity applications, such as word processing, spreadsheet, presentation, and database software.

CIS 140 Java Programming (3)
Introduces Java programming language with an emphasis on object-oriented principles. Students utilize library classes in developing Java standalone applications and applets. Topics include Graphical User Interface (GUI) programming, event-driven programming, inheritance, and polymorphism.

CIS 208 C++ Programming (3)
Emphasizes object-oriented programming in C++. This course provides a comprehensive coverage of C++ features, including arrays, strings, pointers, references, classes, inheritance, polymorphism, function overloading, function overriding, virtual function, and template. Students learn to design and implement object-oriented programs in C++ programming language.

CIS 226 Game Scripting (3)
Introduces the development of computer games using a scripting language. A modern scripting language will be covered and used to develop game programs. Students learn to design and develop cross-platform computer games.

> **D. If applicable, describe any selective admissions policy or specific criteria for students selecting their major field of study.**

None.

> **E. Describe expected student learning outcomes for the proposed program and directly relate these to the general curricular requirements of the program.**

Upon completion of this certificate, graduates will be able to:
- Design computer artwork/animation using current modeling motion-capture tools
- Visualize concepts and ideas into computer animation
- Create movements for objects and characters for games, simulations, or websites
- Manipulate models to perform animations that dictate the movement of a character or an object
- Animate an illusion of motion as a sequence of images using compositing/modeling software
- Generate moving pictures/figures/images to be used in computer games, movies, or websites

3. Faculty

A. Provide a list of current faculty (and areas of expertise) who will teach in the program.

Current College faculty from the specific department discipline will teach the required general education courses, in accordance with COMAR 13B.02.02.17. Current CIS (Computer and Information Sciences) faculty will be able to teach courses required by this new certificate program. One additional adjunct faculty member may be hired, as needed.

B. List faculty by rank required for full implementation of the program. Indicate which additional faculty are to be hired and describe their qualifications.

Name	Qualification	Course
Lisa Hawkins	Ph.D.	CIS101, CIS106
Susan Johnson	M.S.	CIS101, CIS106, CIS140, CIS175, CIS176, CIS177, CIS178
Melanie Kalmar	M.S.	CIS101, CIS106, CIS175, CIS176
Frank Seidel	M.S.	CIS101, CIS106, CIS140, CIS208, CIS226
Walter Martynenko	M.S.	CIS101, CIS106, CIS140, CIS208
Andy Yao	Ph.D.	CIS101, CIS106, CIS140, CIS175, CIS176, CIS177, CIS178, CIS208, CIS226

4. Accreditation

A. Does the institution intend to seek accreditation for this program by one of the specialized accrediting bodies recognized by the U.S. Department of Education?

No outside agency accreditation is required for this program.

B. Does the institution intend to seek any State licensure or certification requirements, which may be necessary for graduates to be employed in this field of study?
No.

C. Describe any additional resources, including facilities, required to gain accreditation or licensure.

FCC has sufficient space to accommodate the courses required by this new certificate.

5. Cooperative Agreements

A. Describe cooperative agreements with other institutions and organizations that may be used to offer this program. Specify the nature of such agreements and attach any formal statements of agreement that have been developed.

None.

B. All public institutions shall show evidence of the development and dissemination of Recommended Transfer Programs (RTP's). In cooperation with sending/receiving institutions. All institutions shall also provide evidence that the RTP's are available to students through ARTSYS or in written form. In order to foster articulation with K-12, community colleges will also identify parallel curricula in secondary schools.

Transfer information will be made available to participants in this program in a variety of methods including hard copy, ARTSYS (articulation information) via the Internet, and other web-based resources.

6. Library Requirements

A. Provide a brief shelf analysis of existing resources to support the proposed program. Indicate the need for additional on-site resources and over what time period do you expect that they will be required. Discuss additional provisions for access to library holdings----e.g. inter-library loans, local library holdings, the UMS integrated library system, and/or other computerized systems that allow access to library resources housed at other institutions. Attach letters of agreement if appropriate.

No significant library holdings will need to be purchased for this program. Current library loan mechanisms and electronic data retrieval methods can be utilized. The library exceeds state and national standards for community, junior, and technical college learning resources programs.

7. Facilities and Equipment

A. How will the proposed program impact on the use of existing facilities and equipment?

Courses required by this new certificate will be offered in existing classrooms.

B. Describe additional facilities, faculty modifications, and equipment which will be required for use in the proposed program. Indicate the status of the facility and equipment requested to support your needs.

No additional facilities and equipment will be needed. One additional adjunct faculty member may be hired, if needed.

8. Minority Student Achievement

A. Identify specific actions and strategies which will be utilized in the recruitment and retention of other-race students.

Frederick Community College has long been committed to the recruitment and retention of minority students and will expand its policies to include this program. The DFRS agencies involved have an aggressive recruitment strategy to encourage diversity amongst its applicants.

9. **Low-Productivity Programs**

   A. **Those low-productivity programs directly related to the proposed program should be addressed. Careful review should consider the fiscal resources (faculty, administration, library resources, and general operating expenses) currently devoted to the low-productivity programs and how those resources can be redistributed to help fund the proposed program.**

Currently there are no low-productivity programs at Frederick Community College which can be redirected.

10. **Finance**
   A. **This information is requested to permit the Secretary to assess the adequacy of resources requested to support this program. Complete Tables 1 and 2. Please provide a narrative rationale for each of the resource requirements.**

FINANCE DATA

Finance data for the first five years of program implementation should be entered in Table 1 – Resources and Table 2 – Expenditures. Figures should be presented for five years and then totaled by category for each year. As an attachment, narrative explanation should accompany each table.

Narrative Table 1: Resources

Tuition and Fee Revenue

Tuition and fee revenue is based upon the in-county combined tuition/fee rate of $189 per credit hour for part-time students and an annual tuition/fee rate of $3,568 for full-time students with an annual average increase of 2.6% for both part-time and full-time students. Full-time students are taking, on average, 13 credits per semester and part-time students are taking, on average, 6 credits per semester. Enrollment projections are based on current enrollment figures for the fall 2014 with a projected 20% increase each year in full-time enrollment and 25% increase in part-time enrollment.

Table 1 RESOURCES					
Resource Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1. Relocation Fund	$0	$0	$0	$0	$0
2. Tuition/Fee Revenue (c+g below)	$44,420	$46,184	$46,764	$47,968	$49,188
a. # F/T Students	8	8	8	8	8
b. Annual Tuition/Fee Rate	$3,568	$3,661	$3,756	$3,854	$3,954
c. Total F/T Revenue (a*b)	$28,544	$29,288	$30,048	$30,832	$31,632

d. # P/T Students	7	7	7	7	7
e. Credit Hr. Rate	$189	$194	$199	$204	$209
f. Annual Credit Hrs.	12	12	12	12	12
g. Total/T Revenue (d*e*f)	$15,876	$16,296	$16,716	$17,136	$17,556
c. Total Benefits	$0	$0	$0	$0	$0
3. Grants, Contracts, & Other External Sources	$0	$0	$0	$0	$0
4. Other Sources	$0	$0	$0	$0	$0
5. Total (Add 1-4)	$44,420	$46,184	$46,764	$47,968	$49,188

Grants and Contracts

None.

Other Sources

No other sources will be used to finance the program.

Narrative Table 2: Expenditures

Table 2 EXPENDITURES					
Expenditure Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1. Faculty (b + c below)	$15,276	$15,582	$15,894	$15,900	$16,211
a. # FTE	.5	.5	.5	.5	.5
b.1. FT Salary	$0	$0	$0	$0	$0
b.2. PT Salary*	$14,184	$14,468	$14,757	$14,763	$15,052
c.1. FT Benefits	$0	$0	$0	$0	$0
c.2. PT Benefits	$1,092	$1,114	$1,136	$1,137	$1,159
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
8. Total (add 1-7)	$15,276	$15,582	$15,894	$15,900	$16,211

* 1 adjunct to teach 9 credits per semester = $788 x 9 credits x 2 semesters = $14,184

Financial Data Narrative

Resources
Reallocated Funds – No college funds are being reallocated for this program.
Tuition/Fee Revenue – (see table)
Grants, Contracts, Other External Resources – none

Expenditures
Faculty – One adjunct faculty will be needed.
Administrative Staff – No additional staff will be needed.
Support Staff – No additional support staff will be needed.
Equipment – No additional equipment will be required.
Library – No additional library costs will be necessary for the program.
New or Revised Space – No new or revised space will be needed.
Other Expenses – No additional expenses are necessary