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February 16, 2024

Sanjay Rai, Ph.D.
Acting Secretary
Maryland Higher Education Commission
6 North Liberty Street
Baltimore MD 21201

RE: New Academic Program – Bachelor of Science (B.S) in Virtual Reality and Gaming

Dear Acting Secretary Rai:

Bowie State University is pleased to submit the enclosed proposal for a new Bachelor of Science program in Virtual Reality and Gaming for your review. This exciting and interdisciplinary program with the Department of Fine and Performing Arts fulfills the growing need for talent in technical and creative fields in the game and XR entertainment industries. This program provides collaborative and interdisciplinary experiences in computer science, XR animation and visual and media arts, and through iterative cycles of design, problem-solving, and analysis will include a formal research component and strategic partnership between the departments of Fine and Performing Arts (VCDMA program) and Computer Science within the College of Arts and Sciences.

The program emphasizes fundamentals such as entrepreneurship, diversity, technology, and inclusion by merging these areas and creating unique partnerships between these departments at Maryland's oldest HBCU. The program will equip graduates with the skills and knowledge to apply computing, modeling, and simulation techniques, and digital media arts (art, animation, interactive, virtual, video, sound) and production for entertainment, immersive experiences, research, education, military, sports, and other disciplines. The innovation of this program lies in our goal to increase diversity, inclusion, and representation of women, minorities, and underserved communities, and to encourage entrepreneurship in the field.

We respectfully request the Commission's approval of this request.

Sincerely,

Aminta H. Breaux, Ph.D.

Cc: Guy-Alain Amoussou, Ph.D., Acting Provost and Vice President for Academic Affairs
Dr. Candace Caraco, Associate Vice-Chancellor for Academic Affairs, USM
Ms. Keshia Ridley, Director of Admissions
Dr. Jacqueline M. Cade, Director of Institutional and Academic Programming



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

Institution Submitting Proposal	Bowie State University
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Each action below requires a separate proposal and cover sheet.

- | | |
|---|---|
| <input checked="" type="radio"/> New Academic Program | <input type="radio"/> Substantial Change to a Degree Program |
| <input type="radio"/> New Area of Concentration | <input type="radio"/> Substantial Change to an Area of Concentration |
| <input type="radio"/> New Degree Level Approval | <input type="radio"/> Substantial Change to a Certificate Program |
| <input type="radio"/> New Stand-Alone Certificate | <input type="radio"/> Cooperative Degree Program |
| <input type="radio"/> Off Campus Program | <input type="radio"/> Offer Program at Regional Higher Education Center |

Payment <input checked="" type="radio"/> Yes	Payment <input type="radio"/> R*STARS # JE234216	Payment \$850	Date 02/14/24
Submitted: <input type="radio"/> No	Type: <input type="radio"/> Check # JE234216	Amount:	Submitted:

Department Proposing Program	Department of Computer Science		
Degree Level and Degree Type	Bachelor of Science		
Title of Proposed Program	Virtual Reality and Gaming		
Total Number of Credits	120		
Suggested Codes	HEGIS: 601.00	CIP: 50.0411	
Program Modality	<input checked="" type="radio"/> On-campus <input type="radio"/> Distance Education (fully online) <input type="radio"/> Both		
Program Resources	<input checked="" type="radio"/> Using Existing Resources <input type="radio"/> Requiring New Resources		
Projected Implementation Date <small>(must be 60 days from proposal submission as per COMAR 13B.02.03.03)</small>	<input checked="" type="radio"/> Fall <input type="radio"/> Spring <input type="radio"/> Summer Year: 2025		
Provide Link to Most Recent Academic Catalog	URL: https://catalog.bowiestate.edu/index.php?catoid=20		

Preferred Contact for this Proposal	Name: Dr. Jacqueline M. Cade
	Title: Director of Institutional and Academic Programming
	Phone: (301) 860-3110
	Email: jcade@bowiestate.edu

President/Chief Executive	Type Name: Aminta H. Breaux, Ph.D.
	Signature: Date: 2-18-24
	Date of Approval/Endorsement by Governing Board:

Bowie State University
BS in Virtual Reality and Gaming

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.

The Department of Computer Science proposes a new BS in Virtual Reality and Gaming. The Department of Fine and Performing Arts will also propose a new Bachelor of Science (BS) degree in BS in Game Design, Immersive Media, and Production and in collaboration with the Department of Computer Science. These exciting and interdisciplinary programs provide much-needed talent for the growing technical and creative positions pipeline in the game, XR, entertainment, and workforce training for companies. As Maryland's oldest HBCU/HBI located in Prince George's County, MD, BSU is uniquely positioned to offer such an innovative and collaborative program. The university is very close to the burgeoning metropolitan areas of Washington, DC, Baltimore, and Annapolis, MD. The proposed degrees between the Department of Computer Science (CS) and the Department of Fine and Performing Arts (DFPA), Visual Communication and Digital Media Arts program (VCDMA), will equip students and graduates with the skills and knowledge to apply gaming, computing, modeling, and simulation techniques for immersive media arts (art, animation, video, sound), game production, entertainment and the metaverse.¹

The DFPA and CS will continue to focus on enhancing and building its courses, curriculum, and capacity and emphasis on animation and motion graphics and of course incorporating more immersive media (XR) courses and skills for our graduates. XR is an umbrella term that encompasses augmented reality (AR), mixed reality (MR), virtual reality (VR), and other forms of alternate, expanded, or immersive reality applications. This new major builds on and applies expertise in computing, visual and media arts, and design to create engaging and immersive gaming systems and experiences. The innovation of this program lies in our goal to increase diversity, inclusion, and representation of women, minorities, and underserved communities and also to encourage entrepreneurship. The strategic partnership will mainly be between the two departments, however, not limited to others in the College of Arts and Sciences, College of Business, and the Entrepreneurship Innovation Center. The collaborative nature of the new degrees and shared experiences between faculty and students of both departments will also greatly enhance the effectiveness of this degree. The proposed program will allow for a high level of creative and technical research and production outside of traditional class structures. Graduates may also continue to a terminal degree in Computer Science, Gaming, Visual Arts, Design, and related majors in digital media, immersive media (XR), and production. The program will equip students and graduates with the skills and knowledge to apply computing, modeling, and simulation techniques, media arts (art, design, animation, video, sound, motion capture), and virtual production for entertainment, research, education, military, sports, and other disciplines.

¹ https://about.meta.com/immersive-learning/?gclid=Cj0KCCQjwteOaBhDuARIsADBqReilYNUl-1z7WJQ_q0V1MBz1OkWuQexeFpPf6tv9arzqK6hyhW4v2ywaAhUyEALw_wcB&gclsrc=aw.ds

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

The new majors will respond to the following institutional goals (based on BSU’s Strategic Plan):

Goal 1: Achieve Academic Excellence Supported by Curricular as well as Co-curricular Experiences, Goal 2: Promote a Holistic and Coordinated Approach to Student Success, Goal 3: Encourage Academic Innovation to Meet Student Needs, Goal 4 - Enhance our campus culture of diversity, inclusion, and civic engagement; and Goal 5: Ensure Long-term Viability of BSU

The two, new majors would respond to the following institutional goals (based on BSU’s Strategic Plan)²: *Goal 1: Achieve Academic Excellence Supported by Curricular as well as Co-curricular Experiences Goal 2: Promote a Holistic and Coordinated Approach to Student Success, Goal 3: Encourage Academic Innovation to Meet Student Needs and Goal 5: Ensure Long-term Viability of BSU*

The proposed new degrees would also contribute to the university’s strategic goals (1, 2, 3, 4, and 5) as follows:

Goal 1—Achieve academic excellence supported by curricular and co-curricular experiences: The two new Bachelor of Science degrees would also contribute to the achievement of Bowie’s 2019 – 2024 Racing to Excellence Strategic Plan, specifically *Goal 1 Academic Excellence, Objective 1.1 High-demand, innovative academic programs.*

Goal 2 - Promote a holistic and coordinated approach to student success: The new BS degrees consist of components from various disciplines and utilizes an approach designed to create a well-rounded student.

Goal 4 - Enhance our campus culture of diversity, inclusion, and civic engagement: BSU is among the top five universities in Maryland that graduate African Americans with bachelor’s degrees in nursing, biology, and computer/information sciences (*Diverse: Issues in Higher Education*).³ The university is committed to providing opportunities to traditionally underrepresented populations in the gaming, entertainment, and STEM/STEAM fields. The new BS degrees will empower “a diverse population of students to reach their potential, by providing innovative academic programs” and by supporting Maryland’s workforce and economy.

Goal 5 - Ensure the long-term viability of Bowie State University (BSU): The current high demand for Game Developers, Animators, XR, and Game Designers will attract many students which in turn will enhance the viability of BSU. The demand for graduates in this field is anticipated to increase and grow. According to Linked In, “Extended Reality will pivot with predictions that the industry will reach a total of US billion in 2024, or a 54% annual growth rate between 2020 and 2024. XR (augmented reality, virtual reality and mixed reality) is one of the fastest-growing industries that are changing our world in dramatic ways. It is a new way to teach,

² <https://bowiestate.edu/about/administration-and-governance/office-of-the-president/reports/bsu-strategic-plan-fy19-fy24.pdf>

³ <https://bowiestate.edu/about/news/2019/diverse-issues-ranks-bsu-as-top-100-producer-of-minority-degrees.php>

train, communicate and connect with customers...”⁴

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 funding of the program will come from tuition and course fees for the first five years. The two departments will fund the programs through existing resources and budgets. Additional funding would be further supported through possible grants, partnerships, and research opportunities with related companies, organizations, agencies, and the industries of game design, XR, and entertainment. The programs rely on existing Computer Science, VCDMA (Fine Arts), and related courses and will require limited new expertise beyond current faculty resources. We intend to use existing courses from among the programs and will need to create only a few new courses to support this program. The Departments of Computer Science and Fine and Performing Arts (VCDMA) has existing partnerships, collaborations, and MOUs with government agencies, studios, and the game design, XR, and entertainment industry. We will leverage the existing partnerships with industry partners to bring real-world experience to the classroom and provide extracurricular learning opportunities. For example, VCDMA has a partnership with Laika Animation Studios as well as MOUs with television and film studios and with local arts, and film organizations such as A + E Networks, Megamind Media, Octet Productions, and the Prince George’s Arts and Humanities Council (PG Film Office).⁵ These strategic partnerships will further create pathways and a pipeline into the professional animation, film, and entertainment industry. Course projections will be monitored annually, and over time, increased demand for courses could necessitate acquiring additional full-time faculty. A request for new faculty will be made to the university administration if the need arises.

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

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

BSU has demonstrated its unwavering commitment to technology-related programs. The administration supported the ABET accreditation of the Computer Science program, which involved a four-year preparatory period followed by another year of study and campus visit by ABET to earn the credential. The administration supports the same process for the planned BS degrees in Game Design and Development (CS); and Game Design, Immersive Media, and Production (DFPA), and especially as the VCDMA and this major will seek accreditation from the National Association of Schools of Art and Design (NASAD)⁶ in 2023. The university's policy is to support program growth by providing funds to hire new faculty, support the development of new courses, and provide additional library resources. Both programs will receive similar support from the university administration. The four computer labs located in the Thurgood Marshall Library support all technology-related classroom instruction and currently have sufficient capacity to simultaneously support most of the new courses proposed for the new BS degrees and programs. The CS department also has several labs which the students use. In addition to these campus labs, the university has also approved the acquisition of access to cloud-based laboratory resources, providing students with state-of-the-art computing resources. The Fine and Performing Arts Center (DFPA) has (2) computer and digital media arts labs, artists’ studios; stop-motion animation studio, video edit suite, film production equipment and facilities to support animation, film, media arts production; sound design, music technology

lab, recording studio and much more.

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

Given the established nature of the computer science degree and fine arts programs, the proposed degrees will be able to manage the incremental resource needs by leveraging the existing curriculum and laboratory infrastructure. With each new year of the new degree offering, only those required for the initial student class will need to be added. Thus, only new freshman classes will be added to the class offerings in the first year of the program. In the second year, the freshman classes will be repeated, and sophomore-level courses will be added. This incremental increase in curricular offerings requires only a gradual increase in expenditure, to which the administration has committed. If, at any point after the full program is launched, the university decides to discontinue the degree program, no new students will be admitted to the program. Currently, enrolled students will be provided with the required classes to complete their degrees.

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

The need for innovative curriculum instruction continues to grow with demands from the marketplace to provide an employable, skilled workforce that can assume new roles of productivity, responsibility, and leadership. Bowie State University, as a HBCU provides support to the postsecondary education goals set forth in the 2013-2017 Maryland State Plan for Postsecondary Education. The proposed BS degrees at Bowie State University (BSU) advance the education and the knowledge of design, art, and technology for immersive game development. It provides training in transferable skills and practice for training and preparing a local workforce that will contribute to and participate in many current and future aspects of economic development in the State of Maryland. The market for immersive gaming continues to grow. In November 2019, the revenue in the United States for the video game industry amounted to approximately 2.25 billion U.S. dollars. As the 2020 publication “Essential Facts About the Game Design Industry” by the Entertainment Software Association (ESA), the author mentions that players of all ages and backgrounds embrace video games. There are more than 214 million video game players across the United States, three quarters of all U.S. households have at least one person who plays video games, and 64 percent of U.S. adults and 70 percent of those under 18 regularly play video games. As a computer science degree, the development of a game is only of marginal scope.⁴ It requires additional STEM/STEAM interdisciplinary collaboration with the Department of Computer Science and as supported by the Department of Fine and Performing Arts such as animation, design, sound/music, storytelling, and production. Other discipline areas could include writing, business, marketing, communications, and entrepreneurship.

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

⁴ <https://www.theesa.com/resource/2020-essential-facts/>

The programs focus primarily on the science, algorithms, concepts, and theory behind computer games and the virtual reality of scientific phenomena. It introduces students, primarily those who are African American as well as other minorities and underrepresented groups to graphic visualization, artificial intelligence, machine learning, human-computer interaction, animation, sound, and immersion. Students at an HBCU such as BSU will further research the socioeconomic, political, and cultural considerations and impact of these new experiences and vice versa as they also learn to conduct themselves as ethical professionals and creatives while further deepening their understanding of XR/AR/VR digital media, design thinking, operating systems, information security, and object-oriented programming.

Table 1: Race/Ethnicity Completion of Degrees within CIP Codes Maryland Region

Race/Ethnicity	Percent of Completions Within CIP Codes	Percent of Completions All CIP Codes
White	37%	49%
Black or African American	22%	21%
Asian	11%	10%
Hispanic or Latino	8%	8%
Two or more races	6%	4%
Race/ethnicity unknown	3%	3%
Nonresident alien	15%	4%
Native Hawaiian or Other Pacific Islander	0%	0%
American Indian or Alaska Native	0%	0%

Source: Aslanian Market Research Education Dynamics for Bowie State University (Page 6– March 2021)

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

Bowie State University recruitment strategies actively seek a diverse student population from Maryland and beyond who will add diverse insights and experiences to the program and the game industry. This program will contribute to the economic growth and vitality of the state by providing new knowledge, skills, and abilities to contribute to, and advance, the workforce in game design. Major companies and organizations are seeking greater diversity and inclusion and especially in the gaming and entertainment industry where they will often face challenges related to diversity, inclusion, ethics, and hands-on skills. The implementation of this new degree can be a catalyst to assist BSU in meeting its strategic goals to achieve academic excellence supported by curricular and co-curricular experiences.

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

The Maryland State Plan for Postsecondary Education has three basic tenets: **Access, Success, and Innovation.**

Access: BSU provides opportunities for many underrepresented Maryland residents to obtain a college education at affordable cost. The new BS degrees and program will provide an avenue for underrepresented students to enter the high demand fields of Gaming, Animation and XR production as well as in the entertainment industry.

Success: Students entering either program at BSU will have access to affordable education, mentoring by a caring faculty, quality advising, and a nurturing environment that will help ensure their success in the program.

Innovation: Students in both programs will be involved with research projects with faculty mentors and industry partners. This exposure to research and innovative techniques under the guidance of academic and game design, animation, XR and entertainment industry experts will continue to help develop the innovative techniques and networking needed to become successful entrepreneurs. The new degrees address the state's perceived need for postsecondary education that enhances the quality and effectiveness of its offerings, provides service to and advances diversity in the fields of entertainment and training, and contributes to workforce development and economic growth in Maryland, as addressed in the Maryland Ready 2013-17 Maryland State Plan. Bowie State University's Departments of Fine Arts and Computer Science have established a record of accomplishment of high-caliber undergraduate education in computer science as well as in visual communication, advertising design, digital media, animation and motion graphics, digital cinema (filmmaking), and fashion design.

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

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

The current outlook for skilled positions in the field of video game design and related professional support is reported by O*NET as well as the U.S. Bureau of Labor Statistics' Occupational Outlook Handbook, and in the section, *Special Effects Artists and Animators*.⁵ According to this information, video game design and related computer occupations are expected to grow rapidly in the State of Maryland from the 2018 reported employment of 1,840 to the 2028 projected employment of 2,140—a 16 percent projected increase.⁶ Game design is a vital and growing field, with high demand in the District of Columbia, Maryland and Virginia (DMV) region. A market survey and report (Education Dynamics Gaming Report) on game design in Maryland were conducted on behalf of Bowie State University by Aslanian Market Research/Education Dynamics in March 2021 and are included in this proposal.

Number of Annual Openings in Region

⁵ <https://www.bls.gov/ooh/arts-and-design/multimedia-artists-and-animators.htm>

⁶ <https://www.onetonline.org/link/summary/15-1255.01>; Valid data are essential to understanding the rapidly changing nature of work and how it impacts the workforce and U.S. economy. From this information, applications are created to facilitate the development and maintenance of a skilled workforce.

There was a total of 6,256 job openings in 2019 within the region. The leading areas with job openings were software developers and software quality assurance analysts and testers. Other positions include entertainment/recreation managers, designers, and computer programmers.

Table 2: Game Design and Related Occupations in the Maryland Region

Occupations	Annual Openings
Software Developers and Software Quality Assurance Analysts and Testers	3,503
All Other; Entertainment and Recreation Managers, (Except Gambling); and Game Development Studio Managers, All Other	1,498
Graphic Designers	407
Computer Programmers	310
Computer and Information Research Scientists	139
Art Directors	107
Artists and Related Workers, All Other	78
Fine Artists, Including Painters, Sculptors, and Illustrators	75
Special Effects Artists and Animators	56
Designers, All Other	47
Commercial and Industrial Designers	38

Source: Aslanian Market Research Education Dynamics for Bowie State University (Page 16 – March 2021)

The field offers ample job opportunities across multiple industries with strong salary potential, both immediately and over a career in industry and even government. There is also significant potential for developing academic pipeline partnerships with the local game industry, which boasts of over forty-five companies located in the DMV area and nearby areas, such as Hunt Valley, MD.

Table 3: Gaming Careers and Average Salary

Top 5 Gaming Careers:	Annual Average Salary
Games Designer	\$66,282 per year
Software Developer & Game Programmer:	\$72,000 per year
Special Effects Animator	\$77,700 per year
Games Artist	\$60,213 per year
Game Play Tester & Quality Assurance	\$53,030 per year

Video games have grown to resemble competition-based, interactive movies, and the COVID-19 pandemic has propelled the industry to make more money than movies and North American sports combined. According to Market Watch, “Global videogame revenue is expected to surge 20% to \$179.7 billion in 2020, according to IDC data, making the videogame industry a bigger moneymaker than the global movie and North American sports industries combined. The global film industry reached \$100 billion in revenue for the first time in 2019, according to the Motion Picture Association, while PwC estimated North American sports would bring in more than \$75

billion in 2020.”⁷

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

There has been increasing academic and artistic attention paid to the study of games and play. Along with a significant serious study of the cultural, pedagogical, and ethical implications of games, designers and artists are attempting to use the power of games and play to address social, civic, and health issues. Gaming and entertainment arts are now included in immersive simulation and occupation training for medical and military applications. This industry is taking a front-row seat to promote user experience for mental health and wellbeing. The gaming industry continues to grow in designed interactive user experiences in education and occupational training at all levels.

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.

The two new degrees and programs empower its graduates for entry and advanced positions in the gaming, XR and entertainment industries. According to the Bureau of Labor Statistics, the job outlook for multimedia artists and animators shows a 6 percent growth rate from 2014-2024 with a median salary of \$63,970 a year, while software developers can expect 17 percent growth and a median salary of over \$100,000 a year.⁸

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

Please refer to Tables 4 and 5.

Table 4: Enrollment Projections and Estimated Growth

Year	2013	2014	2015	2016	2017	2018	2019
Estimated Number of Enrollments	576	630	942	750	666	996	954

Source: Aslanian Market Research Education Dynamics for Bowie State University (March 2021 – Page 10)

⁷ <https://www.marketwatch.com/story/videogames-are-a-bigger-industry-than-sports-and-movies-combined-thanks-to-the-pandemic-11608654990>

⁸ <https://www.bls.gov/ooh/arts-and-design/multimedia-artists-and-animators.htm>

The following table indicates a steady growth in the number of completed degrees across all baccalaureate level programs at institutions operating within Maryland.

Table 5: Number of Graduation Completions in Maryland

Year	2013	2014	2015	2016	2017	2018	2019	Percent Change 2013- 2019
Number of Completions	96	105	157	125	111	166	159	67%

Source: Aslanian Market Research Education Dynamics for Bowie State University (March 2021 – Page 9)

D. Reasonableness of Program Duplication:

There are comparable academic programs in game design and related disciplines in the geographic region. There are a few institutions in the state of Maryland that offer game design degrees, but there is no duplication with the proposed new degrees and programs at Bowie State University. Several community colleges (e.g., Montgomery College, and Frederick Community College) offer an associate degree in gaming and simulation development. The University of Maryland, Baltimore County (UMBC) offers undergraduate concentrations in animation and interactive media and, through the computer science program, a concentration on game development.

The University of Baltimore offers a Bachelor of Science in simulation and digital entertainment that is structured through courses in the Department of Computer Science. The Bowie State University program is a unique undergraduate degree, in that the strengths are in collaboration, innovation, diversity, entrepreneurship, and inclusion within the partnership between the Departments of Fine and Performing Arts and Computer Science. This is further enhanced through strategic partnerships with companies and organizations in the gaming and entertainment industries.

The uniqueness of this proposal is the emphasis not only on game development and design, but also on virtual production, immersive media (XR) and interactive, user experiences as well as collaboration and interdisciplinary approach between computer science and the fine and performing arts, as well as other departments and disciplines at BSU. We also have an added focus on entrepreneurship and a focus on animation, special and visual effects for the entertainment industry.

Table 6: Similar Institutions in Maryland and Degree Completions

Institution	Bachelor's Degree Completions (2019)	Game Design Related Degrees
Maryland Institute College of Art	79	Animation Film & Video & Humanistic Studies Game Design General Fine Arts
University of Maryland-Baltimore County	32	Design
Bowie State University	19	Visual Communication & Digital Media Arts
Stevenson University	19	Graphic Design
University of Baltimore	7	Integrated Arts
Capitol Technology University	3	Information Technology
University of Maryland, College Park	--	Immersive Media Design

Source: Aslanian Market Research Education Dynamics for Bowie State University (Page 11 – March 2021)

2. Provide justification for the proposed program.

Both departments and their various majors have growing recognition in the state and nationally. BSU strives to meet goals of excellence in the delivery of its programs and has the systems and structures in place to support the achievement of these goals. This degree will increase minority participants in the workforce as well as the connections to the local business sector, federal and state government agencies, entertainment companies, and venues that use the new major to continue with the university’s mission to be a model for academic excellence, innovation, and student success. Hunt Valley and Baltimore, Maryland, for example, serve as hubs for several game design companies in the state.⁹ Some of these companies include Firaxis, ZeniMax, Big Huge Games, Sparky Pants and others.¹⁰ The Washington-DC metropolitan area also hosts several animation game design, immersive studios and companies such as that would benefit from this major in terms of graduates such as Bethesda Soft Works, ZeniMax Media and others.¹¹ Enrolling students in these programs will build strong and ongoing relationships with the faculty and industry advisors who can serve as mentors on the projects, products and thesis.

⁹ <https://www.baltimoresun.com/maryland/baltimore-county/towson/ph-tt-neighbor-cockeyville-whatley-0125-20170126-story.html>

¹⁰ <https://builtin.com/companies/location/baltimore/type/gaming-companies>

¹¹ <https://bethesdagamestudios.com/>

This new degree and program support the advancement of diversity and inclusion in the targeted workforce. This program will contribute to the economic growth and vitality of the state by providing new knowledge, skills, and abilities to contribute to, and advance, the workforce in game design. Major companies and organizations are seeking greater diversity and inclusion in the gaming and entertainment industries where they often face challenges related to diversity, inclusion, ethics, and practical skills. The implementation of this new degree can be a catalyst to assist BSU in meeting its mission and strategic goals to achieve academic excellence supported by curricular and co-curricular experiences.

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.

As Maryland's first historically Black institution (HBI/HBCU), Bowie State University is committed to providing access to high-quality higher education to African Americans and other underrepresented minorities. The goals established in the University's Racing to Excellence FY 2019- 2024 Strategic Plan support student achievement and long-term viability of the institution and align with the goals in the 2017-2021 State Plan for Postsecondary Education: Student Success with Less Debt. Specifically, Bowie State University continues to:

***Support** educational opportunity for Marylanders (Success, Strategy 4).*

***Engage** in a continuous improvement process to ensure that institutional policies and practices support student success (Success, Strategy 5).*

***Provide** alternative modalities, new programs, and pedagogies, and streamlined student and academic support services to facilitate timely degree completion (Success, Strategy 6) (Innovation, Strategy 9).*

***Integrate** high impact practices (HIP) into the student experience, including career advising and planning into internship experiences (Success, Strategy 7).*

***Partner** with business, government, and other institutions to support workforce development and graduate readiness (Innovation, Strategy 8).*

***Expand** support for grant participation and research (Innovation, Strategy 10).*

***Innovate** and change management strategies with Bowie State faculty, staff, students, and administrators engaging in and embracing experimentation to better meet the holistic needs of the students (Innovation, Strategy 11).*

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

Bowie State University is a historically Black institution, and this new program does not impact other Maryland HBIs/HBCUs. No other institution of higher education in the state offers this kind of undergraduate program. Bowie State University is compliant with all stipulations of Title VI, Title IX, and Section 504. Furthermore, Bowie State serves an underrepresented minority population, and respect and understanding of diversity is central to its mission of advancing minority student achievement. Accordingly, a student graduating from an HBI/HBCU hopefully will always be concerned about others, especially those who are under-represented and/or marginalized and have great appreciation for the global market and community. The relevance of the proposed degrees is both supported by the marketplaces' need to improve diversity and opportunity across a broad spectrum, to include stories and entertainment production with a

cultural sensitivity as the anchor. The goals of this new program are motivated by these high educational aims. It is axiomatic that HBIs/HBCUs have placed an emphasis on elevating persons who have experienced a multitude of disadvantages, including those accruing from the pattern of racial discrimination. Historically, HBIs/HBCUs have stressed the importance of educating both the head and the heart. The adage that we educate the whole person is a cornerstone of such institutions.

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

The proposed degrees from both departments share the goal to include helping to close the gap between Black students who seek a STEM/STEAM degree and those able to achieve this goal. It will help meet the demand for additional STEM/STEAM programs at HBCUs, support other STEM/STEAM programs on campus, and increase the number of minority gaming/XR developers, animators, and design experts in a geographical area desperate to hire qualified graduates to serve in the field. This degree is positioned to be the only program of its kind for an HBCU within a 50-mile Baltimore/Washington, DC metropolitan radius. The degrees also emphasize fundamentals such as entrepreneurship, diversity, inclusion, ethics, and immersive technology. The merging of these areas forms a unique innovative partnership opportunity to advance the education frontier between the Computer Science and Fine and Performing Arts departments and Bowie State University. The relevance of the proposed degrees is supported by the marketplace’s need to improve diversity and opportunity across a broad spectrum and include the stories, images, experiences and creation from a base of cultural sensitivity and awareness. As more images of people of color appear in games, animation, and thorough interactive and immersive experiences (metaverse), students from underrepresented groups will be drawn to the opportunities in this booming industry.

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 computer science and fine and performing arts (VCDMA) faculty and Game Design Advisory Board and consultants¹² designed the proposed degree program according to the MHEC, ABET & NASAD guidelines. These same members will assist with review, assessment and overseeing the two programs. The development of this program was driven in part by the growing demand by students in the VCDMA and computer science programs and inquiries by potential students. A program coordinator for each degree and in each department will oversee the programs.

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

¹² The BSU Game Design proposal consultants included Solomon Jagwe, Film Director, 3D Artist/Animator, Marianne Hayden, Lead Cinematics Animator, Skydance New Media, Alton Glass, Head of Immersive Media, GRX Immersive Labs, Christine Marsh, Adjunct Instructor (VCDMA) & Metaverse Platform Co-Founder, VCDMA; Roderick Woodruff, Co-Founder/Instructional Designer, Urban Video Game Academy

Program Educational Objectives: *Both BS degrees and programs through their respective departments will develop computer scientists, creatives, technicians, and designers who can:*

Demonstrate fluency in at least one programming or scripting language used in the production of interactive games and be an expert in at least one game development platform.

Demonstrate elements and principles of art/design, principles of animation, problem-solving and design thinking.

Develop and prototype a successful game, entertainment, and/or XR product and/or experience from concept to completion including but not limited to XR (VR, AR & MR).

Produce productions using motion capture, animation, films, special/visual effects, virtual production, and other innovations in technology in the gaming and entertainment industries.

Apply strategies to the gaming and entertainment industries with an entrepreneurial mindset and emphasis on innovation, collaboration, and diversity.

Student Learning Outcomes: *Both BS degrees and programs will develop graduates who will be able to successfully and respective to each degree:*

Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.**

Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline. **

Communicate effectively in a variety of professional contexts.

Recognize professional responsibilities and make informed judgments in computing Practice based on legal and ethical principles. * *

Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.

Apply computer science theory and software development fundamentals to produce computing-based solutions. **

Apply principles of visual organization, including the ability to work with visual elements in two and three-dimensions, color theory and its applications, and drawing. ***

Demonstrate knowledge and skills in the use of basic principles, concepts, tools, techniques, procedures, and technologies sufficient to produce animation art from concept to a finished product that communicates ideas and/or stories to a viewer or to an audience. ***

Demonstrate knowledge of the principles of animation, including its visual, spatial, and sound, motion, and temporal elements and features, and how these elements are combined in the development of animation art. ***

Utilize the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include but are not limited to stop motion, traditional animation, 2D Digital, 3D Digital, etc.). ***

Demonstrate knowledge of the history of animation, game design, immersive media, artistic and technological evolution, and an understanding of basic aesthetics, visual communication, and critical theory.

Collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include but are not limited to working with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

Analyze and synthesize relevant aspects of human interaction in various contexts (physical, cognitive, cultural, social, political, and economic) and with respect to technologically mediated communication, objects, and environments. ***

Understand the importance of diversity, inclusion and the history, culture, and contributions of African Americans and other underrepresented groups in gaming, entertainment, and related industries.

Produce unique and innovative XR (AR, VR & MR) experiences and products to be used in other industries including but not limited to education, business, health, military, sports, the arts, humanities, and natural sciences, and demonstrate a successful portfolio with examples of research, gaming and/or entertainment products, writing and creative content.

****ABET: Accreditation Board for Engineering and Technology (Computer Science)**

***** NASAD: National Association of Schools of Art Design (Fine and Performing Arts, VCDMA)**

3. Explain how the institution will:

- a. provides assessment of student achievement of learning outcomes in the program**
- b. document student achievement of learning outcomes in the program**

Courses and curricula will be reviewed annually for effectiveness via course evaluations, course reviews, and assessments of student work, research, and projects that include senior capstones (products), portfolio reviews, and demonstrations to be reviewed by faculty and an advisory board. This board will consist of industry experts, strategic partners, and university faculty from other institutions. There will also be an extensive and periodic program review of the entire major through external reviewers as well as the College of Arts and Sciences and Academic Affairs. Additionally, there will be periodic program and curriculum reviews by the accrediting bodies such as the Accreditation Board for Engineering and Technology (ABET) and the National Association of Schools of Art and Design (NASAD) to retain membership and demonstrate program success, effectiveness, and accountability.

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

Course and credit hours requirements for the two majors and programs are listed in the tables below. Course descriptions are provided in Appendix A.

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

All students in the two majors and programs are required to take the general education courses listed in Appendix A. These courses are incorporated into each degree and to further strengthen the two programs.

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

Course and credit hours requirements for both BS degree programs are listed in the tables below and appendices A, B and C. Course descriptions are provided in Appendix C.

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

All students in both majors and programs are required to take the general education courses listed in the tables below and incorporated into each concentration to further strengthen the program.

6. Identify any specialized accreditation or graduate certification requirements for this program and its students. None needed and/or 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.

The advisement and course scheme sequences as well as requirements, program goals will be provided to potential students at admission events as well as through intensive advisement, mentoring and program administration. Both CS and the DFPA will work with the Advisement Center, Admissions and URM to provide clear course schema and 4 –year plans for graduation. Please see Appendix A.

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

The program will use the existing promotion mechanisms in the Department of Computer Science and Department of Fine and Performing Arts and within the overall University. These include the undergraduate course catalog, departmental and university web pages, videos, social media and marketing literature. Additionally, folders with information on the major will be available at the admissions open house events and scholarship meetings. More information is available online:

Computer Science: <https://www.bowiestate.edu/academics/colleges/college-of-arts-and-sciences/departments/computer-science/>

Fine and Performing Arts: <https://bowiestate.edu/academics/colleges/college-of-arts-and-sciences/departments/fine-and-performing-arts/> and VCDMA program: https://bowiestate.edu/academics/colleges/college-of-arts-and-sciences/departments/fine-and-performing-arts/undergraduate_programs/vcdma-major/

H. Adequacy of Articulation

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

Computer Sciences has existing articulation agreements with Prince George’s Community College and the College of Southern Maryland. VCDMA will seek to obtain relevant articulation agreements with Prince George’s Community College, College of Southern Maryland. BSU is working to develop others to include. additional local public school systems and others in the region to expand partnerships and agreements further.

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 members with appointment type, terminal degree title and field, academic title/rank, status (full-time, part-time, and adjunct) and the course(s) each faculty member will teach in the proposed program.

Table 9. Computer Science Faculty. The table below catalogs the current full-time, tenure/tenure track faculty members from the Computer Science department who will support the launch of the Virtual Reality and Gaming program. Other part-time faculty are rotated each semester.

Name	Appointment Type & Rank	Terminal Degree	Field	Status	Courses to be taught
Ms. Patricia Hughes	Tenured / Asst Professor	MA-Univ of Wisconsin Madison	Computer Science	Full Time	Programming courses
Dr. Soo Yeon Ji	Tenured / Assoc Professor	Ph.D.-Virginia Commonwealth Univ	Computer Science	Full Time	AI, Discrete Structures
Dr. Darsana Josyula	Tenured / Professor	Ph.D.-Univ of Maryland College Park	Computer Science	Full Time	AI courses
Dr. Jie Yan	Tenured / Professor	Ph.D.- Harbin Institute of Technology	Computer Science	Full Time	Gaming and Virtual Reality courses

Dr. Bo Yang	Tenured / Professor	Ph.D.- Pennsylvania State University	Computer Science	Full Time	All Computer Science courses
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Table 10. DFPA Faculty. The table below catalogs the current full-time, tenure/tenure-track, long term contractual faculty members from the Department of Fine and performing Arts (DFPA & VCDMA program) who will support the launch of the Game Design, Immersive Media and Production major. Other part time faculty are rotated each semester.

Name	Appointment Type & Rank	Terminal Degree	Field	Status	Courses to be taught
Tewodross Melchishua Williams	Tenured / Assoc Professor	MFA, Intermedia & Digital Arts, UMBC	VCDMA	Full Time	2D Animation, Stop Motion Animation, Motion Graphics, Film production Cinematography Internship, History of Animation, Visual Culture, Portfolio review and Assessment (I and II); and Senior Thesis Exhibition and Capstone courses
Arthur Vidrine	Assist Professor	MFA, Fine Arts, School of Visual Arts	Studio Arts (Fine Arts)	Full Time	2D, 3D Design, Art History, Photography
Robert Bartlett	Tenured / Assoc Professor	MFA, Playwriting, Catholic University; MA, English Language, Literature and Culture, Bowie State University	Theatre Arts/ VCDMA	Full Time	History of Animation, Screenwriting

Table 10. DFPA Faculty – cont’d

Name	Appointment Type & Rank	Terminal Degree	Field	Status	Courses to be taught
Ogechi Chieke	Assistant Professor	MFA, Computer Art, School of Visual Arts	VCDMA	Full Time	2D Animation, Video Editing, Cinematography, Computer Graphics, Visual Literacy, Visual Communication Design, Hip-Hop Studio
Robert Bartlett	Tenured / Assoc Professor	MFA, Playwriting, Catholic University; MA, English Language, Literature and Culture, Bowie State University	Theatre Arts/ VCDMA	Full Time	History of Animation, Screenwriting
Amina Hammond	Adjunct Professor	MFA, Web Design, New Media, Academy of Art University	VCDMA	Part Time	Web Design, New Media, Animation and Motion Graphics
Kevin Holder	Adjunct Professor	MFA, Fine Arts, Howard University	VCDMA & Studio Arts (Fine Arts)	Part Time	Computer Graphics, Drawing, Painting
Prince Ikegwuno	Adjunct Professor	D, Sc, Information and Interaction Design, University of Baltimore MFA, Animation, SCAD	VCDMA	Part Time	XR, VR, 2D, 3D Animation, Game Design, Immersive Media, and Multimedia
Myron Smith	Adjunct Professor	Master of Design, Illinois Institute of Technology	VCDMA	Part Time	Design History
Richard Zandler	Adjunct Professor	MFA, Sculpture, University of Pennsylvania	Studio Arts (Fine Arts)	Part Time	Sculpture and 3D Design, Drawing
Hasani Claxton	Adjunct Professor	MFA, Studio Art, Towson University	VCDMA & Studio Arts	Part Time	Illustration, Drawing, 2D Design

			(Fine Arts)		
Amina Hammond	Adjunct Professor	MFA, Web Design, New Media, Academy of Art University	VCDMA	Part Time	Web Design, New Media, Animation and Motion Graphics
John Stephan	Adjunct Professor	MFA, 3D Animation, Savannah College of Art and Design (SCAD)	VCDMA	Part Time	3D Animation and Modeling

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**
- b. The learning management system**

c. Evidence-based best practices for distance education if distance education is offered. Bowie State University provides:

- Continuous training for faculty in all departments relative to the Blackboard learning management system (virtual, hybrid, hyflex and in-person) and various modalities.
- Teaching best practices (for both classroom and online courses).
- Other tools, resources, and techniques to support course delivery.
- Through CETL workshops, Faculty Institute, Assessment and Course Development Coordinators, etc.

Additionally, the University supports faculty member involvement in discipline-specific professional memberships, which provide access to best practices in teaching subject matter. Faculty evaluations include how individual faculty members avail themselves of the available resources and implement improvements in their courses. Continuous faculty improvement also factors into ABET accreditation self-studies, providing additional incentive for all professors to remain engaged with their discipline and craft.

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.

The Thurgood Marshall Library supports teaching and learning through a variety of materials and resources which can support a curriculum for Gaming, Immersive Media, Animation and Computer Science. The library also supports tis proposed major with a collection of over 280,000 volumes (physical and electronic), over 700 academic subscription titles, an electronic portal (Research Port) to over 70 databases, VERVERSI as well as videos and DVD recordings, and an experienced staff. The library also promotes information literacy education by collaborating with the University faculty in utilizing current technology and teaching methods to enhance an instructional program that teaches library clientele how to access, evaluate, and utilize information. The Thurgood Marshall Library is a member of the University of Maryland system and Affiliated Institutions (USMAI), strengthening the resource base for all users. As a member of (USMAI), Bowie State University also has access to the collections of thirteen university libraries in the state of Maryland. In addition to borrowing privileges, the Marshall Library also offers ILL (Interlibrary Loan). Materials not available within USMAI can be requested through interlibrary loan, a nationwide resource for library users. A daily delivery between the participating libraries is provided to assist patrons in obtaining materials from other libraries in the system. In addition, all registered patrons have access to interlibrary loan services, which is a resource sharing system, for materials not available within the USMAI. The library's physical and digital collection of books and resources are appropriate for the proposed new major and program. This collection is presently serviceable for the instructional and research expectations upon this program's majors. To ensure that this collection is more than sufficient for background reading and research undertakings by students in all this program's core and elective courses, the program's faculty are making requests for acquisitions of hundreds of additional volumes, and those requests will be fulfilled during the coming academic year.

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.**

Computer Science the Computer Science Building opened to the BSU community in 2002 as a “state of the art” facility that houses instructional, laboratory, and research spaces for Computer Science and related disciplines. The laboratory space will serve the complete needs of Game Design and Development students. The computer science building includes sufficient flexibility in both classroom, office space, and laboratory space to accommodate the student body increases resulting from the launch of the new degree. The computer resources are available to faculty members and students in the Computer Science Department at BSU. These include fifteen general-purpose computing labs and five research labs. The research labs are described in the project description. Each of the general-purpose labs has 10 to 20 computers. Ten of the labs have computers with 22-inch monitors of the following specification:

- Platform: Windows 10 (64bit), Memory: 16 GB,
- Processor: Intel Xeon CPU E5-1620 v3 @ 3.50GHz,
- Motherboard: Dell Inc. 0K240Y,
- Graphics: NVIDIA Quadro K620 2.0 GB,
- Audio: NVIDIA High-Definition Audio, Realtek Audio,
- Optical: Tschopp DVD+-RW SH-216DB,
- Network: Intel(R) Ethernet Connection I217-LM, and
- Hard Drive: 500GB

Another ten labs have computers with the following specifications:

- Dell Precision Tower 5810,
- Platform: Windows 10 (64bit), Memory:16 GB,
- Processor: Intel Xeon CPU E5-1620 v3 @ 3.50GHz,
- Motherboard: Dell Inc. 0HHV7N,
- Graphics: AMD FirePro W2100 (FireGL V) Graphics Adapter 2.0 GB
- Audio: AMD High Definition,
- Audio Device Realtek Audio,
- Optical: HL-DT-ST DVD+-RW GTA0N,
- Network: Intel(R) Ethernet Connection I217-LM, and
- Hard Drive: 350GB

There are also conference rooms where faculty and students meet to discuss research and make presentations when needed.

The Department of Fine and Performing Arts (DFPA) The Department of Fine and Performing Arts (DFPA) students prepare for success in the Fine and Performing Arts Center (FPAC) a beautiful space featuring a movement studio, band room, Steinway piano rooms and rehearsal studios, a recital hall, a multimedia recording studio, fashion design studio, costume shop, digital music lab, and two theaters. FPAC also hosts two Apple computers and digital media labs with 36 stations; painting, visual art studio, printmaking, painting drawing, ceramic,

3D design/sculpture and photography rooms and studios, and a stop-motion animation studio powered by Laika Studios and a video edit suite set to launch in 2022-23. There are adequate faculty and staff support offices; a conference room, a student lounge and an additional art resource room for possible instruction, collaboration research and presentations to meet with outside guests, presenters, and partners. The Visual Communication & Digital Media Arts program (VCDMA) provides the latest in technology, film/video, and media production equipment and 4K DSLR and digital cinema cameras, audio, lighting, rigging, dollies and much more. The VCDMA program offers 2D/3D animation software, large format printers and resources for research in design, media arts, fashion/costume design, film, animation, visual communication as well as hip-hop studies and visual culture. BSU recently received generous funding and support from Adobe and is now offering the Adobe Creative Cloud suite of creative applications to all students and faculty on campus. The digital media labs in FPAC provide access to the following software: Autodesk Maya, CLO3D, Cinema 4D, Adobe After Effects, Photoshop, Illustrator, Animate, Premiere, Audition, XD, Acrobat; as well as Apple based software such as Final Cut Pro, Compressor, Motion, and screenwriting software, Celtx. Additional animation software includes Toon Boom Harmony, Storyboard Pro and DragonFrame. Most classrooms and spaces in both the Computer Science building and Fine and Performing Arts Center are equipped with smart boards, computers, and hyflex classrooms, AV projection capabilities. The small incremental increase in class sections each semester for the majors will not strain the usage of classroom space or instructional resources. Bowie State provides all students with full access to campus counseling, academic advisement services, IT support services, retention support and other administrative resources.

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

Students that take online course offerings within both programs will receive support comparable to that provided to residential students. All students will receive access to technology tools required to complete coursework and research, including University email support, LMS support, software development environment tools (compilers, editors, DBMS), and full access to the BSU IT help desk personnel. The Department of Computer Science has signed an agreement with Tele-Communications Systems to provide a cloud-based virtual lab environment and lab exercises accessible to online and residential students. The Department of Fine and Performing Arts also provides mixed modalities of instruction through classrooms/labs that are also equipped with smart boards, cameras, monitors, mobile and stationary hyflex/hybrid teaching spaces, and studios to support blended and flipped classrooms and support of students no matter where they are (online or in person); synchronous or asynchronous.

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

BSU demonstrates its commitment through budget reallocation and support from staff offices such as the library and IT department.

Table 11. Resources. This table projects revenue for full-time-equivalent students and part-time equivalent students for the initial five-year period. The department estimates that 10 new students will be admitted in the first year, 2-5 the second year, etc., increasing to a max of 30 full-time students in Years Four and Five, respectively. Part-time students are expected to be nominal. Graduates are expected by the fourth year.

TABLE 1: DEPARTMENTS OF COMPUTER SCIENCE & FINE AND PERFORMING ARTS RESOURCES					
Resource Categories	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
1.Reallocated Funds ¹	0	0	0	0	0
2. Tuition/Fee Revenue ² (c+ g below)	72,577	85,887	152,988	214,288	302,704
a. #Full-Time Students	10	12	18	25	30
b. Annual Tuition/Fee ⁴	8,753	8,928	9,107	9,289	9,475
c. Annual Full-Time Revenue (a x b)	87,530	107,137	163,919	232,219	284,236
d. # Part-Time Students	3	4	6	8	10
e. Credit Hour Rate ⁵	258	263	268	274	279
f. Annual Credit Hours	18	20	40	40	60
g. Total Part-Time Revenue (d x e x f)	13,932	21,053	64,422	87,613	167,560
3. Grants, Contracts, & Other External Sources ³	0	0	0	0	0
4. Other Sources	0	0	0	0	0
TOTAL (Add 1 – 4)	72,577	83,887	152,988	214,288	302,704

1. Whenever reallocated funds are included among the resources available to new programs, the following information must be provided in a footnote: origin(s) of reallocated funds, impact of the reallocation on the existing academic program(s), and the way the reallocation is consistent with the institution’s strategic plan.

2. This value represents 67% of the projected total Tuition & Fee revenues for Full-Time & Part-Time students since mandatory fees are allocated to Auxiliary PT rate only reflects the tuition rate.

3. Whenever external funds are included among the resources; the following information must be provided in a footnote: source of the funding and alternative methods of funding the program after the cessation of external funding.

4. Tuition Rate is based on the posted FY 2023 Proposed Tuition and Rate schedule with a 2% increase in the subsequent years.

5. Credit Hour Rate is based on the FY 2023 Proposed Tuition & Rate Schedule with a 2% increase in the subsequent years.

Table 12. Department of Computer Science Expenditures

This table describes projected expenditures. Although most of the faculty and support staff, instructional tools, and facilities are already in place in the Department of Computer Science (CS), it is anticipated that the new proposed program will require an additional full-time faculty member and one adjunct faculty.

TABLE 2: EXPENDITURES COMPUTER SCIENCE					
Expenditure Categories	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
1. Total Faculty Expenses (b + c below)	92,249	94,094	95,975	97,895	99,852
a. # FTE	1	1	1	1	1
b. Total Salary ¹	69,360	70,747	72,162	73,605	75,077
c. Total Benefits ²	22,889	23,347	23,813	24,290	24,775
2. Total Assistant Systems Administrator Expenses (b + c below)	71,559	72,990	74,451	75,940	77,459
a. # FTE	1	1	1	1	1
b. Total Salary ³	53,804	54,880	55,978	57,098	58,240
c. Total Benefits ⁴	17,755	18,110	18,473	18,842	19,219
3. Total Adjunct Expenses (b + c below)	42,120	42,962	43,822	44,698	45,592
a. # FTE	1	1	1	1	1
b. Total Salary ⁵	39,000	39,780	40,576	41,387	42,215
c. Total Benefits ⁶	3,120	3,182	3,246	3,311	3,377
4. Equipment ⁷	10,000			10,000	
5. Library					
6. New or Renovated Space					
7. Other Expenses	5,000	5,000	5,000	5,000	5,000
TOTAL (Add 1 - 7)	220,928	215,046	219,248	233,533	227,903

1-Average Salary for Assistant Professors in Computer Science for FY 2021 with a 2% increase in subsequent years.

2-Average Benefits for Assistant Professors in Computer Science for FY 2021 is 33% of salary with a 1% increase in subsequent years.

3- Average Salary for Assistant Systems Administrator in FY 2021 with a 2% increase in subsequent years.

4- Average Benefits for Assistant Systems Administrator in FY 2021 is 33% with a 1% increase in subsequent years.

5- Average Salary for Adjunct Faculty (\$6,500 per course x 6 courses) in FY 2021 with a 2% increase in subsequent years.

6- Average Benefits for Adjunct Faculty in FY 2021 is 8% with a 1% increase in subsequent years. 7-Equipment is the cost for (2-3) computers on a three-year replacement cycle.

Table 13: DFPA Expenditures. This table describes projected expenditures. Although most of the faculty and support staff, instructional tools, and facilities are already in place in the Department of Fine and Performing Arts (DFPA), it is anticipated that the new proposed program will require an additional full-time faculty member, one program coordinator/faculty and an adjunct professor. Additional costs for advertising and promotional materials are estimated at \$3, 500/year.

TABLE 2: EXPENDITURES DFPA					
Expenditure Categories	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
1. Total Faculty Expenses (b + c below)	86, 450	88, 179	89, 942	91, 742	93, 817
a. # FTE	1	1	1	1	1
b. Total Salary ¹	65, 000	66, 300	67, 626	68, 979	70, 539
c. Total Benefits ²	21, 450	21, 879	22, 316	22, 763	23, 278
2. Total Faculty Coordinator Expenses (b + c below)	94, 750	99, 070	101, 153	103, 176	105, 240
a. # FTE	1	1	1	1	1
b. Total Salary ³	70, 000	71, 400	72, 828	74, 285	75, 771
c. Total Benefits ⁴	24, 750	27, 670	28, 325	28, 891	29, 469
3. Total Adjunct Expenses (b + c below)	6, 480	6, 610	6, 741	6, 876	7, 014
a. # FTE	1	1	1	1	1
b. Total Salary ⁵	6, 000	6, 120	6, 242	6, 367	6, 494
c. Total Benefits ⁶	480	490	499	509	520
4. Equipment ⁷	50, 000		75, 000		
5. Library					
6. New or Renovated Space					
7. Other Expenses	2, 500	2, 500	2, 500	2, 500	2, 500
TOTAL (Add 1 - 7)	240, 180	196, 359	207, 836	204, 294	208, 571

1-Average Salary for Assistant Professors in DFPA for FY 2021 with a 2% increase in subsequent years.

2-Average Benefits for Assistant Professors in DFPA for FY 2021 is 33% of salary with a 1% increase in subsequent years.

3-Average Salary for Program Coordinator in FY 2021 with a 2% increase in subsequent years. 4-Average Benefits for Program Director in FY 2021 is 33% with a 1% increase in subsequent years.

5-Average Salary for Adjunct Faculty (\$3, 000 per course x 2 courses) in FY 2021 with a 2% increase in subsequent years.

Average Benefits for Adjunct Faculty in FY 2021 is 8% with a 1% increase in subsequent years.

6-Equipment is the cost for computers, upgrades, motion capture suits, software on a three-year replacement cycle.

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.

Courses and curriculum will be reviewed annually for effectiveness via course evaluations, course reviews and assessments of student work, research, projects, including capstones, portfolio reviews and demonstrations to be reviewed by faculty and an advisory board. This board will consist of industry experts, strategic partners as well as university faculty from other institutions. There will also be extensive program review of the entire major by external reviewers as well as the College of Arts and Sciences and Academic Affairs. The processes for evaluating courses, faculty, and student learning outcomes will follow the guidance presented by the ABET Council on Computing. Industry and graduate schools recognize ABET accreditation as the hallmark of excellence in undergraduate STEM education.

Faculty evaluation will follow BSU guidelines for all faculty members, including evaluation input from students, administrators, and departmental personnel, per COMAR 13b.02.03.15. In addition, faculty evaluations will include the following:

- Evaluation of faculty qualifications and how they are adequate to cover all the curricular areas of the two majors and programs—this will include the size, specialization, credentials, and experience of the faculty.
- Analysis of faculty workload; and
- Professional development opportunities for each faculty member.

Evaluation of student learning outcomes in Computer Science will be based on assessment of the stated ABET and outcomes using the continuous improvement processes. Additionally, for the Department of Fine and performing Arts (VCDMA) once membership is obtained, there will be periodic reviews by accrediting bodies such as NASAD: National Association of Schools of Art and Design to retain membership and demonstration of program success, effectiveness, and accountability.

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 evaluation of the program educational objectives will follow the same process currently used for both BS degrees and majors and for each department. Evaluation of the program's educational effectiveness will include:

- Ensuring that the program's educational objectives are aligned to the BSU mission.
 - Ensuring that the program's educational objectives align to the needs of the constituencies.
 - Following a documented process and timeline to review the program educational objectives. Following a documented process to ensure that the student outcomes are mapped to the program educational objectives.
 - Analyzing how the program's requirements and its associated prerequisite structure support the attainment of student outcomes.
 - Analysis of program criteria describing how the program meets the specific requirements for the Game Design, Animation, XR and entertainment fields as they evolve. Analysis of materials (syllabi, textbooks, samples of student work—low, medium, and high graded) that will be available for accreditors during site visits.
 - Analysis of class size on achievement of learning outcomes.
 - Evaluation of student retention and student achievement will follow established BSU policy used by all departments. The courses, the program's effectiveness, enrollment, retention and graduation rates, students, instructors, and staff satisfaction will be evaluated using student, faculty, and staff surveys and program committee reviews on a regular basis.
-

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.

As Maryland’s first historically Black institution, Bowie State University is committed to providing high quality higher education to African Americans and other underrepresented minorities. The goals established in the University’s Racing to Excellence FY 2019 – FY 2024 Strategic Plan supports student achievement and long-term viability of the institution and align with the goals in the *2017-2021 State Plan for Postsecondary Education: Student Success with Less Debt*. Specifically, Bowie continues to:

- Support educational opportunity for Marylanders (Success, Strategy 4)
- Engage in a continuous improvement process to ensure that institutional policies and practices support student success (Success, Strategy 5).
- Provide alternative modalities, new programs and pedagogies and streamlined student and academic support services to facilitate timely degree completion (Success, Strategy 6) (Innovation, Strategy 9).
- Integrate high impact practices into the student experience, including career advising and planning into internship experiences (Success, Strategy 7).
- Partner with business, government, and other institutions to support workforce development and
- Graduate readiness (Innovation, Strategy 8).
- Expand support for grant participation and research (Innovation, Strategy 10).

Bowie State faculty, staff, students, and administrators are engaging in change management strategies and embracing experimentation so that we can better meet the holistic needs of our students (Innovation, Strategy 11). Bowie State University has a long-standing core commitment to diversity; it values and celebrates diversity in all its forms. The University community believes that its educational environment is enriched by the diversity of individuals, groups, and cultures that come together in a spirit of learning. As the University aspires to even greater racial diversity, it fully embraces the global definition of diversity that acknowledges and recognizes differences and advances knowledge about race, gender, ethnicity, national origin, political persuasion, culture, sexual orientation, religion, age, and disability. The university creates positive interactions and cultural awareness among students, faculty, and staff through infusing global diversity awareness in the curriculum, expanding co-curricular programming that promotes diversity awareness, and maintaining a campus climate that respects and values diversity.

O. Relationship to Low Productivity Programs Identified by the Commission

This new program has no relationship with a low productivity program identified by the Commission.

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

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

The university has the resources to offer a quality distance education program. The university utilizes the state-of-the-art Blackboard system as well as cloud based virtual laboratories. And all faculty are trained in offering distance learning education 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 institution has met the nine guidelines as required by the Council of Regional Accrediting Commissions (C-RAC).

APPENDIX A. – Course Schema and 4 –Year Plans for both BS degrees

BS in Virtual Reality and Gaming. Core Courses (for both majors) shared by CS and DFPA:

Course #	Course Title	Credit Hours
COSC 109	Gaming I	3
COSC 112	Computer Science I	4
COSC 113	Computer Science II	4
COMM 220	Gaming Industry: Principles, Strategies and Fundamentals	3
COSC 209	Gaming II	3
COSC 214	Data Structures and Algorithms	4
COSC 309	Gaming III	3
COSC 317	Augmented, Virtual & Mixed Reality	3
Course #	Course Title	Credit Hours
VCDM 394	History of Animation or VCDM 367 Design History	3
VCDM 396	2D Digital Animation I or VCDM 392 Motion Graphics	3
COSC 477	XR Virtual Reality and its Principles	3
COSC 479	Immersive XR Virtual Reality	3
COSC 494	Gaming IV (Capstone)	3
Total Core Courses		42

Supporting Courses:

Course #	Course Title	Credit Hours
MATH 155	Probability and Statistics (CS)	3
MATH 225	Calculus I	4
COSC 208	Discrete Structures	3
MATH 228	Linear Algebra	3
ENGL 362	Technical Writing	3
BIOL 101	Biological Science (Life Science)	4
PHYS 271	General Physics I (Physical science)	4
Total Supporting Requirements Credits		24

Additional supportive courses (suggested):

IDIS 110 Introduction to Entrepreneurship and or IDIS 210 Problem-Solving Using Design Thinking, MGMT 101 Introduction to Business (- 3 CREDITS each). Other COSC, VCDM, ART, ENGL, MGMT & MKTG elective courses in Computer Science and VCDMA, Studio Arts (Fine Arts), Language, Literature and Cultural Studies, Business and Marketing.

Course #	Course Title	Credit Hours
COMM 101	Oral Communications	3
Arts and Humanities elective		3
Social Sciences		6
HIST 114 or HIST 115	African American History to 1865 African American History since 1865	3
Social Sciences Elective		3
Technology FULFILLED BY MAJOR		3/4
Total General Education		46/47

BS Degree in Gaming and Virtual Reality, Computer Science Required Courses

Course #	Course Title	Credit Hours
COSC 374	Object-Oriented Design	3
COSC 375	Object Oriented Design and Development	3
COSC 402	Software and Operating System Security	3
COSC 418	Principles of Computer Graphics (required)	3
COSC 431	Database Management (required)	3
COSC 465	Software Engineering (required)	3
COSC 469	Advanced Software Engineering (required)	3
COSC 473	Artificial Intelligence (required)	3
COSC 474	Machine Learning and Discovery	3
COSC 476	Natural Language Processing	3
COSC 485	Data Communications and Networks	3
Total Required Course Credits: 33		

BS, Gaming and Virtual Reality course scheme and 4-year plan General Education and Institutional Requirements

Freshman Year

<u>First semester</u>	<u>Credit</u>	<u>Second Semester</u>	<u>Credit</u>
COSC 112 Computer Science I	4	COSC 113 Computer ScienceII	4
MATH 225 Calculus I	4	MATH 226 Calculus II	4
ENGL 101 Expository Writing	3	ENGL 102Argument and Research	3
FRSE 101 Freshman Seminar	3	COMM 101 Oral Communication (COMM 220) choose one (GE)	3
COSC 109 Gaming I	3	COSC 209 Gaming II	3
Total:	17	Total:	17

Sophomore Year

<u>First semester</u>	<u>Credit</u>	<u>Second Semester</u>	<u>Credit</u>
COSC 208 Discrete Structures	3	COMM 220 Gaming Industry: Principles and Fundamentals or elective (COSC, VCDM, 100/200)	3
COSC 214 Data Structures and Algorithms	4	MATH 228 Linear Algebra	3
IDIS 110 Introduction to Entrepreneurship	3	BIOL 101 Biological Science	4
MATH 155 Probability and Statistics	3	HIST 114 or 115 African American History	3
Social /Behavioral Science Gen Ed Elective	3	Health and Wellness Elective	3
Total:	16	Total:	16

Junior Year

<u>First semester</u>	<u>Credit</u>	<u>Second Semester</u>	<u>Credit</u>
PHYS 271 General Physics	3	COSC 418: Principles of Computer Graphics	3

COSC 309 Gaming III	3	VCDM 394 History of Animation	3
COSC 317 Augmented, Virtual & Mixed Reality	3	ENGL 362 Technical Writing for Computer Science (suggested)	3
		Arts and Humanities Gen Ed Elective	3
COSC 431: Database management	3	COSC 465: Software Engineering	3
Total:	12	Total:	15

Senior Year

<u>First semester</u>	<u>Credit</u>	<u>Second Semester</u>	<u>Credit</u>
VCDM 396 2D Animation I	3	COSC 429: Data Visualization	3
COSC 477 Virtual Reality & its Principles	3	COSC 479 Immersive Virtual Reality	3
COSC 469: Advanced Software Engineering	3	COSC 499 Gaming IV	3
COSC 473: Artificial Intelligence	3	COSC 474 Machine Learning	3
Elective	3		
Total:	15	Total:	12

APPENDIX B. COURSE DESCRIPTIONS

COMPUTER SCIENCE

COSC 109: GAMING I - 3 CREDITS *Prerequisite(s): None.* This course will introduce students to the process of good game design. Students will work in teams in an iterative process to design, implement, and evaluate a 2D game. Topics will include idea generation, storyboarding, and human-computer interaction. The course will include readings and play testing, and each team will present their completed game in a game showcase at the end of the course.

COSC 209: GAMING II - 3 CREDITS *Prerequisite(s): COSC 109 or COSC 112.* This the course focuses on designing simple playable games, each exploring different aspects of game design such as rule design, game balance, multiplayer strategy, complexity, randomness, narrative, psychology, emergent behavior, and aspects of physical game bit and interface design. The course will cover game design concepts through readings, presentations, and play testing and emphasize the hands-on development of games.

COSC 309: GAMING III - 3 CREDITS *Prerequisite(s): COSC 113, 209.* This course introduces techniques used to create computer animation. Topics include principles of animation, motion planning, and generation, key framing, kinematics, inverse kinematics, and motion technology. Students will develop a game using Computer Graphics Library.

COSC 317: Augmented, Virtual and Mixed Reality - 3 CREDITS *Prerequisite(s): COSC 113, 209:* This course introduces students to the design process for producing virtual reality (VR), augmented reality (AR), and mixed reality (MR) games. The course covers a wide range of literature and practice starting from the original computer science and HCI concepts through the evolution of all supporting technologies including visual displays (for VR, AR, and MR), motion tracking, interactive 3D graphics, multimodal sensory integration, immersive audio, user interfaces, IoT, games and experience design.

COSC 489: Immersive Virtual Reality - 3 CREDITS *Prerequisite(s): COSC 317, 477:* This course covers the technical and experiential design foundation required for the implementation of immersive environments in virtual, augmented, and mixed reality platforms. This course will apply player-centric game design frameworks to create immersive 3D experiences using the latest hand-held and wearable devices. Project work will explore how VR-AR game design can make immersive experiences more fun, how game engines with extended reality devices are becoming the film cameras of the future for immersive cinema and 3D animation.

COSC 499: GAMING IV - 3 CREDITS *Prerequisite(s): COSC 309, 477:* This game design and development capstone course will involve a full production cycle of game development from brainstorming concepts to designing, implementation, playtesting, and evaluating a complete game. Topics will include graphics game engines, motion generation, behavioral control for autonomous characters, interaction structure, and social and interface issues of multi-user play. The course will emphasize hands-on development of games and students will document their work in the form of written reports and oral presentations.

COSC 112: Computer Science I - 4 CREDITS *Prerequisite(s): None.* (Students without programming experience may be advised to take COSC 111 before or concurrently with COSC 112.) This course is a study of the formal syntax and semantics of a programming language. Topics include expressions, assignments, declarations, control structures, arrays, data abstractions, subprograms, user interfaces, error handling, end of file handling, and string handling. Aspects of Software Engineering include top-down design, structured programming, and style in programming conducted in a block structured language. Ethical and social issues include information privacy, data reliability, data security, including wiretapping and encryption and ergonomics. This course may be used to satisfy the General Education Requirement in the Technology category.

COSC 113: Computer Science II - 4 CREDITS *Prerequisite(s): COSC 112.* Prerequisite or taken concurrently: MATH 141 or MATH 150. Students are introduced to the programming tools required to solve a more advanced set of problems. Students further develop their knowledge of the principles of object-oriented design and programming, including the use of interfaces and inheritance. Topics include arrays, strings, records, classes, inheritance and composition, pointers, recursion, and linked lists. It is designed for students who have prior training in computer concepts and terminology. Professional ethics and social issues (including sustainability) which relate to professionalism in Computer Science are also considered. This course may be used to satisfy the General Education Requirement in the Technology category.

COSC 214: Data Structures and Algorithms - 4 CREDITS *Prerequisite(s): COSC 113 or COSC 190.* This course explores the definitions and implementations of basic data structures such as stacks, queues, linked lists, binary trees, etc.; internal searching and sorting algorithms; and garbage collection algorithms. Design of sort and search algorithms and introductory analysis associated with the basic data structures, as well as recursive algorithms, are discussed.

COSC 208: Discrete Structures - 3 CREDITS *Prerequisite(s): COSC 113 or COSC 190 and either MATH 141 or MATH 150.* The course covers fundamental mathematical concepts and algebraic structures, such as Logic, Sets, Relations, Functions, Induction and Recursion, Probability & Statistics, and an introduction to the theory of graphs and trees. It is a course in discrete mathematics that is an integral part of computer science's undergraduate curriculum. The course's purpose is to ensure that the students become comfortable with the theoretical framework within which ideas in computer science are expressed.

COSC 374: Object- Oriented Design and Development - 3 CREDITS
Prerequisite(s): COSC 214. This course covers the design and development of object-oriented programs. Specifically, students will study object-oriented design methods, classes, inheritance, polymorphism, and software engineering issues. Students will acquire the ability to analyze a problem using object-oriented techniques. They also will learn a widely used object-oriented language such as JAVA, using a Unix platform.

COSC 477 – Virtual Reality and its Principles - - 3 CREDITS *Prerequisite(s): or taken concurrently: COSC 113; or consent of instructor.* This course introduces students to Virtual Reality (VR) hardware and software. It provides an opportunity for them to apply this knowledge to applications for education and games. This course applies cutting-edge virtual reality technology currently available in academia and industry. Students will design, model, and script the VR environment by developing a complete VR application as a group project.

COSC 402: Software and Operations System Security - 3 CREDITS *Prerequisite(s): COSC 330 or Consent of Instructor.* This course will examine security principles and practices important to operating systems and programming. Topics include OS security architecture; memory security; authentication, including account and password protection mechanisms; assessing OS vulnerabilities; programming security and attacks such as buffer overflow attacks and writing secure code; application interaction; module control; auditing host security, including operational logs; malicious logic including viruses and virus protection; and security applications.

COSC 410: Data Communications and Networks - 3 CREDITS *Prerequisite(s): COSC 214 and COSC 284.* This course explores the fundamentals of data communication and computer networking: common carrier implications, tariffs, exchanges, concentrators, multiplexors, and buffering; circuit, message, and packet switching; network architectures and protocols; protocol standards, modeling, and analysis; cost and design; software considerations are emphasized. (Formerly: COSC 485)

COSC 418: Principles of Computer Graphics - 3 CREDITS *Prerequisite(s): COSC 214 or MATH 228.* This course introduces students to basic concepts and essential principles of Computer Graphics from programming perspective. It includes topics such as Geometric Modeling, Lighting/Shading, Subdivision of Curves and Surfaces, Mesh Parameterization, Texture Mapping, Morphing, and Animation. Students will use a standard Computer Graphics Library and develop simple algorithms of Computer Graphics to reinforce the concepts.

COSC 431: Database Management - 3 CREDITS *Prerequisite(s): COSC 214.* This course is an introduction to concepts, design objectives, tools, and principles database management system software. Descriptors, structures, database system architectures, entities, relationships, and data models. The relational, network and hierarchical database models, normal forms, and canonical data structures will be studied as a basis for logical organization. Relational algebra and calculus, introduction to concurrency, and transaction management are studied.

COSC 465: Software Engineering - 3 CREDITS *Prerequisite(s): COSC 214.* This course introduces the student to major topics in software engineering such as: requirements specification, analysis and design, testing, project management, and implementation. Additional topics such as software life cycle models, the Unified Modeling Language (UML), agile software development techniques, configuration management, change control and version control tools, object-oriented design, and project documentation will be discussed.

COSC 473: Artificial Intelligence - 3 CREDITS *Prerequisite(s): or taken concurrently: COSC 113; or consent of instructor.* This course introduces students to Virtual Reality (VR) hardware and software. It provides an opportunity for them to apply this knowledge to applications for education and games. This course applies cutting-edge virtual reality technology currently available in academia and industry. Students will design, model, and script the VR environment by developing a complete VR application as a group project.

COSC 474: Machine Learning and Discovery - 3 CREDITS *Prerequisite(s): COSC 214.* Artificial intelligence techniques for knowledge acquisition by computers. Fundamental problems in machine learning and discovery. Systems that learn from examples, analogies, and solved problems. Systems that discover numerical laws and qualitative relationships. Projects centering on implementation and evaluation.

COSC 476: Natural Language Processing - 3 CREDITS *Prerequisite(s): COSC 474.* This course covers a broad range of topics in natural language processing. It is intended for students who are familiar with machine learning fundamentals. Topics include finite-state methods; context-free and extended context-free models of syntax, parsing and semantics interpretation; n-gram and Hidden Markov models; part-of-speech tagging; coreference resolution; discourse structure; and natural language applications such as machine translation, automatic summarization, sentiment analysis and question answering.

COURSE DESCRIPTIONS DEPARTMENT OF FINE & PERFORMING ARTS (STUDIO & VCDMA)

ART 101: 2D Design - 3 CREDITS this course is a study of visual organization. Theories of spatial organization and designing in various materials will be studied.

ART 102: 3D Design - 3 CREDITS this course is a study of visual organization. Theories of spatial organization and designing in various materials will be studied.

ART 110: INTRODUCTION TO DRAWING - 3 CREDITS This course provides the fundamentals in the practice of drawing in various media, development of artistic discrimination, and drawing skills.

ART 111: LIFE DRAWING - 3 CREDITS This course is a study of the costumed and nude figure.

ART 310: PORTRAIT & FIGURE SCULPTURE - 3 CREDITS Armature construction and practical experience in creating basic forms in metal, clay, plaster, wood, and stone will be provided

VCDM 215: ANIMATION, DESIGN CONCEPTS AND PRINCIPLES - 3 CREDITS
An introductory course to cover an overview of the basics of animation and motion graphics, principles of animation, drawing for animation, character, scenic design, and storyboarding. **proposed new course*

VCDM 220: VIDEO GAMING, ANIMATION & ENTERTAINMENT DESIGN I - 3

CREDITS This hands-on studio course provides the foundations of interactivity, immersive technology, and visual approaches to using design tools to create animation, motion graphics, sound, film to produce a successful game, immersive, and/or interactive experience.

**proposed new course*

VCDM 267: Video Gaming, Entertainment Arts, & Immersive Media in Society - 3

CREDITS Prerequisite: ENGL 102. A course in theory and critical and overview of the history of the video gaming industry, entertainment media and immersive technology and its impact on society, business, and connections to popular culture. **proposed new*

course

VCDM 320: VIDEO GAMING, ANIMATION & ENTERTAINMENT DESIGN II -

3 CREDITS Prerequisites VCDM 220. This studio course will provide students with hands-on storytelling, conceptualization, design, and creation of visual, interactive, and immersive experiences for entertainment such as motion capture, advanced animation, motion graphics, and cinema production techniques. **proposed new course*

VCDM 315: CONCEPTUAL THINKING IN DRAWING AND ILLUSTRATION

3 CREDITS. Prerequisite(s): ART 110 or 111. Through a series of illustration-based exercises and problems students will be helped to enhance creative and technical skills for communicating visual concepts. Students will learn the professional processes of collecting reference work, creating thumbnail sketches and rough drafts. Projects are designed to increase knowledge and understanding of compositional strategies, color theory, conceptualization and exploration of materials and techniques. Students will use prior experience in drawing, painting, graphic arts, digital media or art made from repurposed materials to develop strong and effective illustrations for the purpose of marketing, journalism or personal expression.

VCDM 360: DIGITAL CINEMATOGRAPHY I - 3 CREDITS

This course is a study of the principles of digital video/cinema including the use, operation, basic digital video editing, as well as the developing narratives and scripts for short video projects and exercises.

VCDM 361: DIGITAL CINEMATOGRAPHY II: ADVANCED DIGITAL EDITING & COMPOSITING TECHNIQUES - 3 CREDITS

Prerequisite(s): Junior Standing, VCDM 360 formerly Cinematography II. This course is a continuation of ART 360. Emphasis is on special digital video and compositing techniques, as students will develop a short digital video project over the course of the semester.

VCDM 367: DESIGN HISTORY - - 3 CREDITS

Prerequisite(s): ENGL 102. The course will focus on the historical and technological developments in design over the 19th, 20th and current century. This course will look at how design has helped shape and communicate with society's values, and contributions in design and technological innovations.

VCDM 368: ANIMATION, GAME DESIGN & PRODUCTION I. - - 3 CREDITS

Prerequisite(s): VCDM 320 & 496. Students work collaboratively to design, prototype and develop all phases of production of a final game, virtual, immersive entertainment product, and/or prototype for the senior capstone, portfolio.

VCDM 370: SCREENWRITING 3 CREDITS Prerequisite(s): ENGL 102. An overview of screenwriting and provides VCDMA students and introduction to the basic principles of writing and developing narratives for film and television. The course will also provide a foundation in writing narratives for digital video/film production and provide students an understanding the screenplay format, editing and revision process as well as the basics of the business of screenwriting.

VCDM 378: IMMERSIVE MEDIA ARTS & DESIGN 3 CREDITS Prerequisite(s): VCDM 320. Students are provided techniques the best practices in design, art, and aesthetics for immersive, interactive experiences and production as well as XR, VR, AR technologies; and as they intersect with visual media and content creation. **proposed new course*

VCDM 392: MOTION GRAPHICS - 3 CREDITS Permission of instructor only. Advanced Standing and/or VCDM 340. This course provides an overview of industry-standard motion graphics tools and techniques, and provides training in advanced compositing techniques, animation, and modeling used in real-world studio situations.

Students are guided through 2D animation, visual effects, compositing, rendering, lighting, and setup for animation. Motion Graphics further covers 3D modeling for objects, environments, particle systems, materials, lighting, and 3D simulation.

VCDM 394: HISTORY OF ANIMATION - 3 CREDITS Prerequisite: ENGL 102. This course will explore the history of American animation from film to television. In addition to the major animation studios, the course will explore the role of minority and female animators. The influence of animation on media will be addressed from the aesthetic, technical, business, and cultural perspectives.

VCDM 395: STOP-MOTION ANIMATION - 3 CREDITS This is a hands-on studio course that focuses of stop-motion and experimental animation, as well as the genres of replacement animation, pixilation, puppet, paper, cut-out, object animation, motion graphics and visual effects. The course emphasizes the principles of animation as it intersects film and digital media production, technology, and the television and film industry.

VCDM: 396 2D DIGITAL ANIMATION I - 3 CREDITS this course is an introduction to animation using state-of-the-art software and hardware for motion graphics. It provides a study of animation principles as well as techniques in producing two dimensional digital animations.

VCDM 397: 2D DIGITAL ANIMATION II - 3 CREDITS As a continuation of VCDM 396, this course allows students to develop skills in two-dimensional digital animation production, character animation, motion graphics, and advanced animation principles. Students will work on a variety of lessons throughout the semester and on an extended animated production.

VCDM 407: AFRICAN AMERICAN CINEMA - 3 CREDITS Prerequisite(s): Advanced standing; ENGL 213 or ENGL 250, and VCDM 360. This advanced course examines in depth the art, history, aesthetics, and cinematography of films produced by African Americans and women of color. This examination will focus on several elements, including

the filmmakers, directors, actors, production (studio produced vs. independent), technical and production elements, characterization, genre and film language.

VCDM 408: VISUAL CULTURE - 3 CREDITS A visual study and critical discourse on the aesthetics of contemporary art and theory as it intersects with urban culture and artistic movements such as hip-hop. This course explores the aesthetics, philosophies, and foundations of hip-hop by focusing on musical, poetic (spoken word), and visual expressions rooted within the culture. Visual and performance artists who have been influenced by and who incorporate hip-hop into their work will also be studied. Students will also study the relationship between hip-hop to visual art, multimedia, video/film, as well as with other cultures, and the political, social, and historical movements in African American history.

VCDM 410: HIP-HOP STUDIO - 3 CREDITS An interdisciplinary and advanced course that incorporates an innovative approach to combining workshop, lecture and studio into actual creative projects using hip-hop and the elements of MCing, DJing, Graffiti, B-Boy/B-Girl (Dance) and Knowledge as the catalyst for creative, collaborative research projects rooted within hip-hop and visual culture.

VCDM 450: MULTIMEDIA WORKSHOP: WEB DESIGN & DIGITAL STUDIO - 3 CREDITS Prerequisite(s): ALL: Junior Standing. This course is designed to give the student an opportunity to explore the creative possibilities in multimedia including interactive, web design, and presentation graphics media.

VCDM 451: ADVANCED TOPICS IN MULTIMEDIA, WEB DESIGN, XHTML & CSS - 3 CREDITS. This course is a continuation of VCDM 450 Multimedia Workshop. This advanced course focuses on web design, hand-coding and scripting for web design, and specifically using XHTML, CSS, ActionScript and other technologies. Student will also research and produce examples of web design and/or interactive media and incorporate current trends and practices for both the internet and mobile devices.

VCDM 464: SPECIAL TOPICS: VIRTUAL PRODUCTION STUDIO - 3 CREDITS Permission Only. Advanced Standing. This advanced studio course will provide students hands-on storytelling, conceptualization, virtual design and the creation of immersive experiences for entertainment such as motion capture, advanced animation, motion graphics and digital cinema production techniques, including special and visual effects as well as other topics focusing on technology, culture and diversity. **proposed new course*

VCDM 468: Game Design and Development Project II - 3 CREDITS A continuation of VCDM 368. Students work collaboratively to complete production of a final game, entertainment product and/or prototype for senior capstone, portfolio. **proposed new course*

VCDM 470: SELF PROMOTION & MARKETING IN THE ARTS - 3 CREDITS Prerequisite(s): Junior/Senior Standing; Permission only. The course focuses on developing and expanding the students' use of technology components, skills and practices such as: the integration of video, print design and online media to create proper marketing materials to promote the student's future chosen careers in the visual and/or performing arts.

VCDM 491: INTERNSHIP IN ART & VISUAL COMMUNICATION - 1 CREDIT.

Prerequisite(s): Junior/Senior Standing; Permission only and at least 24 credit hours (upper level) in area of concentration. This advanced internship and apprenticeship course is intended to help students in Art and VCDMA (computer graphics) make their way into the professional art, design/ multimedia, and visual communication world. The class serves as a bridge between students and professionals in the various art/design, industries, and students.

VCDM 492: INTERNSHIP IN THE GAMING AND ENTERTAINMENT INDUSTRY

- 1 CREDIT. Prerequisite(s): Junior/Senior Standing; Permission only and advanced standing in area of concentration. This advanced internship course is intended to help students under the gaming major (gaming and entertainment concentration) make their transition into the game or entertainment design industry by getting valuable work experience, build skills and develop networks with professionals and mentors.

**proposed new course*

VCDM 496: 3D ANIMATION AND MODELING I - 3 CREDITS this course is an overview of 3D computer animation & modeling. Through in-class lectures, assignments, and homework, you will be instructed on how to use 3D software for basic modeling, rendering, lighting, and setup for animation. Different methods of conceptualizing characters will be discussed and illustrated. There will also be instruction in using a bitmap-based paint and illustration application to create textures. The student will also learn some basic compositing techniques and computer simulation. The students will also be exposed to how the applications are used in real-world studio situations.

VCDM 497: 3D ANIMATION AND MODELING II - 3 CREDITS this course is a continuation of VCDM 496 3D Modeling & Animation. Students are instructed and guided through advanced technique for modeling, rendering, rigging, lighting, and setup for animation. Advanced character, scene and object design as well as 3D simulation will also be covered. The course provides training in advanced compositing techniques, animation and modeling used in real-world studio situations

ADDITIONAL DFPA & COMMUNICATION & OTHER SUPPORTIVE COURSES

Music Technology

MUSC 230: INTRODUCTION TO SOUND DESIGN FOR VISUAL MEDIA - 3 CREDITS This course serves as an engaging introduction to the basic skills needed to design immersive, high quality sound design for various forms of visual media including animation, film, and game design.

Theatre Arts

THEA 100: ACTING (FOR NON-MAJORS) - 3 CREDITS this course introduces students to the craft of acting on and off stage through theatre exercises, improvisations, and scene studies, as it develops an appreciation for acting as an art form.

THEA 441: SCENE DESIGN - 3 CREDITS Prerequisite(s): Stagecraft, Lighting, Technical Production. Recommended: ART 101 Design, and ART 102-103 Drawing. Preparation of sketches based on the principal styles and periods in the theatre; balance,

composition, color, and unity of stage settings as applied to a script. Study and practice using various techniques and media stressing line, mass, color, lighting, and form.

Communications

COMM 220: Gaming Industry: Principles, Strategies and Fundamentals - 3

CREDITS the focus of this course is to introduce students to the fundamental concepts of the gaming industry and provide historical, theoretical, and logical approaches to digital and visual gaming strategies. The students will learn various applications of streaming and digital communications technologies, the assessment of gaming audiences, the gaming industry, and an overview of game production. This course expands on gaming fundamentals, strategies, and game development with an emphasis on diversity and inclusion. **proposed new course*

Business and Marketing

MGMT 101: INTRODUCTION TO BUSINESS - 3 CREDITS This is a survey course designed to acquaint students with the basic functional areas of business enterprises and covers terminology and functional issues facing managers. This course acquaints students with international aspects of business.

MKTG 231: PRINCIPLES OF MARKETING - 3 CREDITS this course is an introduction to the field of marketing and the issues of marketing management. Areas of study include consumer behavior, social responsibility of marketers, marketing of goods and services, industrial marketing, and logistics of distribution, pricing, product-planning and development, promotion, the selling function, and government regulations.

MKTG 341: ENTERTAINMENT MARKETING - 3 CREDITS Prerequisite MKTG 231. This is an introductory course which helps students develop a thorough understanding of the marketing concept and theories through various entertainment events. The areas this course covers include basic marketing, target marketing and segmentation, sponsorship, event marketing, promotions, sponsorship proposals, and entertainment marketing plans. This course also delves into the components of promotion plans, sponsorship proposals and the key elements needed in operating successful entertainment events.

Entrepreneurship Academy Courses

IDIS 110: INTRODUCTION TO ENTREPRENEURSHIP - 3 CREDITS Introduction to Entrepreneurship provides participants with the tools necessary for applying entrepreneurial thinking in their work and life. This course introduces participants to the fundamentals of entrepreneurship, providing them a blueprint for the ideas and strategies to build a successful venture.

IDIS 210: PROBLEM SOLVING USING DESIGN THINKING - 3 CREDITS this course provides an overview of design thinking to help students understand the concept as a problem-solving approach and an innovation tool. Design Thinking encompasses concept development, applied creativity, prototyping, and experimentation thinking, as it relates to understanding customers' needs.

Language, Literacy and Cultural Studies

ENGL 253: STUDIES IN POPULAR CULTURE - 3 CREDITS Prerequisite: ENGL 102.

This course will examine and analyze popular culture and its representation in different media ranging from hip-hop music to sci-fi cinema. Specifically, the manifestations of pop culture in literature, film, television, music, and advertising will be assessed, as will the growing role of technology in the creation and understanding of culture. In addition, this course will assess the rhetorical situation of the examined texts and analyze those texts through the application of traditional rhetorical and literary methods.

ENGL 261: GENDER, CULTURE, AND IDENTITY - 3 CREDITS this course is designed to introduce students to the basic concepts and perspectives in Women's Studies/Gender Studies. This course will place the category of gender and culture at the center of analysis it is an inter-disciplinary, transnational study of the significance of gender in shaping the cultural experience of communities and individuals.

ENGL 333: GRAPHIC NOVELS - 3 CREDITS Prerequisite(s): ENGL 102. This course uses the analytic tools or literary theory and cultural studies to study the graphic novel and the way in which this medium creates narrative meaning through the dynamic interplay of images and words. Students will learn the history of graphic novels and read works created domestically and internationally with special attention given to image-text relationships, form, style, and the cultural identities of characters, artists and readers.

ENGL 361: TECHNICAL AND REPORT WRITING - 3 CREDITS Prerequisite: ENGL 102. This course is a study of the requirements of technical and report writing, coupled with a review and refinement of basic grammar and composition skills, designed to prepare students for career-related assignments using sophisticated software packages.
