Maryland CTE Programs of Study

Animation and Game Development III (2025)

GENERAL REQUIREMENTS. This course is recommended for students in Grades 10-12. 1

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INTRODUCTION 2

A **Career and Technical Education (CTE) instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.** 2.A

B **The Arts, Entertainment and Design Career Cluster combines creative roles in visual and performing arts, film, journalism, fashion, interior design, and creative technologies. This Cluster focuses on creating, producing, and sharing artistic and design work across multiple platforms, aiming to entertain, inform, beautify, and inspire.** 2.B

C **The Animation and Game Development pathway prepares students to create both two-dimensional (2D) and three-dimensional (3D) digital experiences for film, television, advertising, virtual reality, and interactive entertainment. Students progress from foundational 2D motion graphics to professional-level 3D modeling, rigging, rendering, and real-time integration, mirroring the production pipelines used by Maryland's leading animation and game studios.** 2.C

D **Animation and Game Development III is an advanced course within the Arts, Entertainment, and Design Career Cluster, aimed at high school students advancing skills in digital content creation and production. The course prepares learners to sit for comprehensive industry- standard credentials (e.g., game-engine artist/programmer or professional animation exams) and to showcase a demo reel for postsecondary programs or entry-level employment.** 2.D

E **Students will participate in at least two Career-Connected Education and Work-Based Learning experiences in this course, which might include informational interviews or job shadowing relevant to the program of study.** 2.E

F **Students are encouraged to participate in extended learning experiences through ligned Career and Technical Student Organizations (CTSOs). CTSOs are a**

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cocurricular requirement in the Carl D. Perkins Act, and alignment to CTSO activities is an expectation for CTE programs in the state of Maryland. 2.F

KNOWLEDGE AND SKILLS 3

A The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to: 3.A

1. Identify and demonstrate positive work behaviors that enhance employability and job advancement, such as regular attendance, promptness, proper attire, maintenance of a clean and safe work environment, and pride in work. 3.A.1
2. Demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, active listening, and a willingness to learn. 3.A.2
3. Employ effective reading, writing, and technical documentation skills. 3.A.3
4. Solve problems using critical thinking techniques and structured troubleshooting methodologies. 3.A.4
5. Demonstrate leadership skills and collaborate effectively as a team member. 3.A.5
6. Implement safety procedures, including proper use of software and following privacy guidelines. 3.A.6
7. Exhibit an understanding of legal and ethical responsibilities in the Animation and Game Development field, following data privacy laws and best practices for security. 3.A.7
8. Demonstrate time-management skills and the ability to prioritize tasks in a technical setting. 3.A.8

B The student identifies various career pathways in the Animation and Game Development field. The student is expected to: 3.B

1. Develop a career plan that includes the necessary education, certifications, job skills, and experience for specific roles in Animation and Game Development. 3.B.1
2. Create a professional resume and portfolio that reflect skills, projects, certifications, and recommendations. 3.B.2
3. Demonstrate effective interview skills for roles in media and Animation and Game Development. 3.B.3

C The student develops technology and digital literacy skills. The student is expected to: 3.C

1. Collaborate effectively on complex projects, communicate design concepts clearly, and present professional portfolios that showcase technical and creative expertise on a variety of platforms 3.C.1
2. Organize, manage, and document projects using file management systems, version control, and industry-standard terminology while adhering to ethical practices and copyright laws. 3.C.2
3. Use industry-standard tools such as Blender, Autodesk Maya, and Adobe Animate to design, model, rig, and animate 2D and 3D assets, incorporating advanced techniques like texturing, rendering, and lighting. 3.C.3

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4 Use Unity to import assets, manage scenes, and create interactive experiences through animation controls, particle systems, shaders, and scripting using C# programming. 3.C.4

5 Prepare 3D models, animations, and effects for efficient rendering and real-time performance, using techniques such as polygon reduction, UV mapping, and platform- specific optimization. 3.C.5

6 Create visually engaging content using Adobe After Effects for compositing, motion graphics, and post-production while applying principles of color theory, composition, and visual hierarchy. 3.C.6

D The student integrates core academic skills into Animation and Game Development practices. The student is expected to: 3.D

1 Document design processes, create project proposals, and present ideas using clear, professional language tailored to technical and creative contexts. 3.D.1

2 Use geometry, algebra, and proportional reasoning to create accurate 3D shapes, scale models, and optimize animations for timing, resolution, and performance. 3.D.2

3 Apply concepts of physics, motion, lighting, and optics to simulate realistic environments, effects, and interactions in animations and game design. 3.D.3

4 Write and debug scripts to control animations, game logic, and interactivity while using algorithms and problem-solving techniques to address technical challenges. 3.D.4

5 Apply design principles such as balance, contrast, and color theory to create visually engaging animations and interactive environments. 3.D.5

E The student demonstrates advanced 3-D production techniques for professional animation and game assets. The student is expected to: 3.E

1 Execute high-poly sculpting, retopology, baking, and texturing workflows for hero assets. 3.E.1

2 Implement advanced rigging and inverse kinematics to achieve expressive character motion. 3.E.2

3 Develop node-based or code-based shaders to create stylized or photoreal visual effects. 3.E.3

F The student demonstrates comprehensive game-development skills by producing a polished vertical slice. The student is expected to: 3.F

1 Build custom levels, user interfaces, and audio elements that support a cohesive gameplay loop. 3.F.1

2 Integrate particle systems, cinematic sequences, and real-time lighting pipelines. 3.F.2

3 Optimize builds for performance, including frame-rate profiling and platform-specific settings. 3.F.3

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G **The student demonstrates narrative design and cut-scene production for interactive media. The student is expected to:** 3.G

1. Write branching dialogue trees and event charts aligned with core game mechanics. 3.G.1
2. Produce animated narrative short films and/or video-game cut-scenes (2D or 3D) that advance plot and character development. 3.G.2
3. Synchronize voice-over, music, and sound effects to enhance emotional impact. 3.G.3

H **The student demonstrates capstone project management and readiness for advanced industry credentials. The student is expected to:** 3.H

1. Plan, scope, and manage a collaborative capstone project that aligns with selected industry-standard certifications. 3.H.1
2. Conduct peer and external reviews using professional rubrics and iterate on deliverables accordingly. 3.H.2
3. Present a professional demo reel, portfolio, and résumé to postsecondary programs or potential employers. 3.H.3

I **The student demonstrates advanced world building and thematic consistency in game design. The student is expected to:** 3.I

1. Develop cohesive fictional worlds with consistent lore, geography, and design language. 3.I.1
2. Align environmental storytelling with core game themes and mechanics. 3.I.2
3. Implement tools for dynamic world interaction, such as environmental triggers or non- linear exploration paths. 3.I.3

J **The student integrates gamification techniques into interactive projects. The student is expected to:** 3.J

1. Design systems of player progression using points, levels, leaderboards, or badges. 3.J.1
2. Apply motivational frameworks (e.g., Self-Determination Theory) to increase player/user retention. 3.J.2
3. Develop analytics or feedback systems that adapt gameplay based on user behavior. 3.J.3

K **The student applies advanced C# programming techniques to develop interactive gameplay systems in Unity. The student is expected to:** 3.K

1. Create modular and reusable scripts using object-oriented principles. 3.K.1
2. Develop and manage complex gameplay features such as AI behaviors, UI systems, or inventory mechanics. 3.K.2
3. Integrate Unity APIs and input systems to respond to user interactions across devices. 3.K.3

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4 Use debugging, testing, and optimization strategies to improve code performance and maintainability. 3.K.4

L The student develops proficiency in 2D and 3D animation techniques using industry-standard animation software for game-design applications. The student is expected to: 3.L

1 Create and animate characters, objects, and backgrounds using 2D and 3D software vector tools. 3.L.1

2 Apply principles of traditional animation, such as exaggeration and timing, to develop engaging 2D and 3D sequences. 3.L.2

3 Integrate 2D and 3D animations within Unity to add layers of interaction and depth to game environments. 3.L.3

4 Export 2D and 3D animations in appropriate formats for integration into game and multimedia projects. 3.L.4

M The student showcases project-based skills and professional-quality work in a portfolio format. The student is expected to: 3.M

1 Plan, execute, and present a comprehensive animation or game project, documenting each stage from concept to final output. 3.M.1

2 Incorporate feedback from peers and instructors to refine projects and meet quality standards. 3.M.2

3 Prepare a professional portfolio that includes completed projects, assets, and animation sequences relevant to certification exams and industry expectations. 3.M.3

4 Demonstrate readiness for certification exams by showcasing mastery of required skills in Unity, Adobe Animate, and 3D game art. 3.M.4