

Game Design and Development, Advanced

8401 36 weeks

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Course Description

Suggested Grade Level: 10 or 11 or 12

Prerequisites: 8400

Students will work collaboratively in teams to refine their game design skills as they apply graphic design, animation, audio and writing skills to create innovative games for education and entertainment. This project-based course enhances problem solving, project management, and communication skills through the analysis, design, construction, and critique of interactive games. Students will learn about career opportunities in game design and development and investigate the training and certification requirements.

Task Essentials Table

- Tasks/competencies designated by plus icons (⊕) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (○) are optional
- Tasks/competencies designated by minus icons (⊖) are omitted
- Tasks marked with an asterisk (*) are sensitive.

Task Number	8401	Tasks/Competencies
Interpreting the Culture and Purpose of Games		
39	⊕	Analyze the elements of a successful game.
40	⊕	Explain the effects of games on the user.
41	⊕	Explain the effects of games on society.
42	⊕	Identify the purposes of games.
43	⊕	Define the <i>culture</i> of a game.
Applying Ethics and Regulations to Game Design		
44	⊕	Investigate accessibility guidelines for game platforms.
45	⊕	Adhere to intellectual property laws.
46	⊕	Interpret the Entertainment Software Rating Board (ESRB) rating system.
47	⊕	Explain end user license agreements (EULA).

48	+	Summarize the security concerns of the user and developer.
Investigating the Functionality of Games		
49	+	Differentiate among game genres.
50	+	Compare game platforms.
Working with Narrative/Concept Design		
51	+	Describe the components of storytelling.
52	+	Develop a storyline.
53	+	Apply a perspective.
54	+	Develop a setting.
55	+	Develop characters and assets.
56	+	Create a storyboard.
57	+	Present a narrative/concept.
Exploring Game Design and Development Teams		
58	+	Perform the role of a team member.
59	+	Collaborate with team members in performing different game design roles.
60	+	Evaluate role as a team member.
Planning the Production of a Game		
61	+	Implement the elements of a successful game.
62	+	Describe the audience.
63	+	Identify the components of a game engine.
64	+	Plan a timeline for production.
65	+	Create a flow chart for game progression.
Creating Assets		
66	+	Build a playable or nonplayable actor.

67	+	Build an object.	
68	+	Create an environment.	
69	+	Apply visual effects.	
70	+	Apply audio effects.	
71	+	Develop a user interface.	
Creating a Game Build			
72	+	Integrate assets into a game.	
73	+	Implement interactivity into a game.	
Performing Quality Assurance			
74	+	Perform alpha testing.	
75	+	Perform beta testing.	
76	+	Examine beta testing feedback/results.	
Exploring Game Publication			
77	+	List ways that games are published.	
78	+	Explain digital rights management (DRM).	
79	+	Define <i>porting</i> .	
Capturing the Market			
80	+	List marketing options.	
81	+	Evaluate the influence of marketing on the success of a game.	
82	+	Create marketing materials.	
83	+	Research economic principles as they relate to the marketing of games.	
Ensuring Career Readiness			
84	+	Update a multimedia portfolio.	
85	+	Outline a chosen career pathway in game design and development.	

86	+	Describe the process and requirements for obtaining industry certifications related to the Game Design and Development, Advanced course.
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Legend: + Essential ○ Non-essential - Omitted

Curriculum Framework

Interpreting the Culture and Purpose of Games

Task Number 39

Analyze the elements of a successful game.

Definition

Analysis could include

- player engagement
- balance (difficulty level)
- control (i.e., players make choices that affect the outcome)
- rewards (e.g., scoring, advancement through levels, animations, random rewards)
- goals and feedback (i.e., games that provide clear, achievable goals and useful feedback)
- effective marketing.

Process/Skill Questions

- What are the criteria to determine whether a game is successful?

TSA Competitive Events

Video Game Design

Task Number 40

Explain the effects of games on the user.

Definition

Effects may include

- psychological
 - addiction
 - symptoms
 - effects
 - treatments
 - desensitization
 - empathy
- physical
 - seizures
 - carpal tunnel
 - vision impairment
 - therapy
 - exercise
- social
 - cocooning
 - virtual/global connections
 - bullying
- intellectual
 - educational
 - training
 - adaptive.

Process/Skill Questions

- What are some of the indicators of the positive and negative effects of gaming?
- What measures can be put in place to monitor the effects?
- What are the potential consequences of failing to monitor the effects?

ITEEA National Standards

4. The Cultural, Social, Economic, and Political Effects of Technology

Task Number 41

Explain the effects of games on society.

Definition

Explanation may include

- social interaction (both positive and negative)
- the influence on family dynamics
- ethical questions regarding the line between fantasy and reality
- violent behaviors
- how other media drives games
- how games drive other media
- conventions (e.g., E3, Comic-Con)
- massively multiplayer online (games) (MMOs).

Process/Skill Questions

- Who are the potential responsible parties for the negative influences of games on society?
- What are examples of relationships between games and other types of media?
- How can game situations potentially affect real life?

ITEEA National Standards

4. The Cultural, Social, Economic, and Political Effects of Technology

Task Number 42

Identify the purposes of games.

Definition

Identification should include

- testing hardware limits
- providing research
- persuasion
- training
- education
- entertainment
- simulation.

Process/Skill Questions

- Why is it important to identify the purpose before designing a game?
- What purposes other than financial gain drive game creation?

Task Number 43

Define the *culture* of a game.

Definition

Definition should include characteristics inherent to a particular game culture (e.g., anime, medieval, fantasy, retro).

Process/Skill Questions

- What are some examples of games with distinct cultures?
- Why are some individuals drawn to particular games?

Applying Ethics and Regulations to Game Design

Task Number 44

Investigate accessibility guidelines for game platforms.

Definition

Investigation should include Americans with Disabilities Act (ADA) driven web standards compared to available guidelines for game platforms.

Note: As of publication in June 2018, accessibility guidelines (e.g., closed captioning) for game platforms do not exist.

Process/Skill Questions

- What is meant by accessibility?
- Why does accessibility matter?
- What are recent innovations in accessible game design?

Task Number 45

Adhere to intellectual property laws.

Definition

Adherence should include acknowledging sources for borrowed materials.

Process/Skill Questions

- What is protected under copyright laws?
- Who owns intellectual property?

ITEEA National Standards

4. The Cultural, Social, Economic, and Political Effects of Technology

TSA Competitive Events

Video Game Design

Task Number 46

Interpret the Entertainment Software Rating Board (ESRB) rating system.

Definition

Interpretation should include

- ratings
 - E (Everyone)
 - EC (Early Childhood)
 - E 10+ (Everyone 10+)
 - T (Teen)
 - M (Mature)
 - AO (Adult Only 18+)
 - RP (Rating Pending)
- content descriptors.

Process/Skill Questions

- How are ratings categorized?
- What are some examples of games with specific ratings?

Task Number 47

Explain end user license agreements (EULA).

Definition

Explanation should include

- code of conduct (e.g., no hate language, racism, violence, threats)
- license
- restrictions
- modifications to the application (e.g., no piracy, no altering or exploitation of the game)
- terms and termination
- severability
- amendments to the agreement
- contact information.

Explanation should also include who agreements are intended to protect/limitations of liability.

Process/Skill Questions

- When one clicks *Accept*, what does that mean?
- What are the differences in EULAs?
- Why might one be banned?

Task Number 48

Summarize the security concerns of the user and developer.

Definition

Summary should include

- provider economies
- users' personal information
- developers' measures to protect users.

Process/Skill Questions

- Who is responsible for protecting personal information in provider economies?
- Who is responsible for user safety?

Investigating the Functionality of Games

Task Number 49

Differentiate among game genres.

Definition

Differentiation should include

- action
 - sports
 - combat
 - platform
 - racing
- strategy
 - war games
 - puzzles
 - god games
- simulator games
 - flight sims
 - racing sims
- role-playing (e.g., online RPGs)
- point-and-click
- educational.

Process/Skill Questions

- What qualities are associated with games of strategy?
- What are examples of games that fall into multiple categories?
- What is the relationship between the game genre and hardware and between the game genre and the platform?

Task Number 50

Compare game platforms.

Definition

Comparison should include similarities, differences, and uses for platforms.

Process/Skill Questions

- What limitations to games are imposed by specific platforms?
- What user interfaces are more specific to a platform?
- What are the capabilities for cross-platforming?

Working with Narrative/Concept Design

Task Number 51

Describe the components of storytelling.

Definition

Description should include

- plot
 - backstory
 - conflict
 - resolution
- character
 - protagonist
 - antagonist
- setting
- theme
- point of view.

Description should also include how storytelling contributes to a successful game.

Process/Skill Questions

- What are the essential elements to consider when creating a story?
- Why does it make sense to identify the components of storytelling?
- How do the components of storytelling help engage the user?
- What are the foundations of a successful game?

Task Number 52

Develop a storyline.

Definition

Development should include

- purpose (i.e., the victory condition)
- conflict
- levels
- challenges
- climax
- resolution.

Process/Skill Questions

- What is the *hook* of a story?
- Why format the story?
- How do levels and challenges motivate the game player?

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Video Game Design

Task Number 53

Apply a perspective.

Definition

Application could include one or more of the following

- first person
- second person
- third person
- aerial positioning
- top down
- side scrolled.

Process/Skill Questions

- How do different perspectives alter the game?
- How does the type of game influence camera placement?

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Video Game Design

Task Number 54

Develop a setting.

Definition

Development could include

- lighting
- foreground/background
- topography/terrain
 - urban
 - rural
 - reality-based
 - fantasy
- mood
- color scheme
- era
 - current
 - historical
 - futuristic
- time of day.

Process/Skill Questions

- How does the setting affect the overall design of the game?
- How does the setting influence the characters?

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Video Game Design

Task Number 55

Develop characters and assets.

Definition

Development could include

- individual backstory
- attributes
 - physical traits
 - super powers
- accessories
- objects.

Process/Skill Questions

- Why is a backstory important to character development?
- How do a character's attributes affect the player's game experience?

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Video Game Design

Task Number 56

Create a storyboard.

Definition

Creation should include a visual representation of the narrative design.

Process/Skill Questions

- What are the advantages of creating a storyboard?
- How does storyboarding differ between film/animation vs. interactive games?

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Task Number 57

Present a narrative/concept.

Definition

Presentation should include

- genre of the game
- components of the storyline (description of levels)
- perspective
- setting
- description of characters/assets
- storyboard
- persuasive elements of a pitch.

Process/Skill Questions

- What role does the pitch have in the development of a successful game?
- Who is involved in the pitch? Explain.

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Exploring Game Design and Development Teams

Task Number 58

Perform the role of a team member.

Definition

Performance could include roles such as

- game testers
- programmers
- artists
- strategists
- designers
- audio engineers
- writers
- producers
- managers.

Process/Skill Questions

- What qualities make an individual better suited for a specific role?
- Which roles can expect the highest salaries and which roles can expect the lowest salaries?

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Video Game Design

Task Number 59

Collaborate with team members in performing different game design roles.

Definition

Collaboration should include

- displaying respect for others' opinions
- compromising

- giving and receiving constructive criticism
- sharing of ideas
- facilitating conflict resolution.

Process/Skill Questions

- How do the different roles facilitate streamlining the process of game development?
- How does the hierarchy of roles influence team collaboration?
- What are different methods for decision making?

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Video Game Design

Task Number 60

Evaluate role as a team member.

Definition

Evaluation should include

- self-reflection
- peer feedback
- teacher/instructor feedback.

Process/Skill Questions

- When is it appropriate to engage in self-reflection and/or peer evaluation?
- What behaviors are typically addressed in a peer evaluation?
- What determines a successful evaluation?

Planning the Production of a Game

Task Number 61

Implement the elements of a successful game.

Definition

Implementation should include

- player engagement
- balance (difficulty level)
- control (i.e., players make choices that affect the outcome)
- rewards (e.g., scoring, advancement through levels, animations, random rewards)
- goals and feedback (i.e., games that provide clear, achievable goals and useful feedback)
- effective marketing.

Process/Skill Questions

- What determines whether a game is successful?
- What are the criteria to determine whether a game is successful?

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17. Information and Communication Technologies

Task Number 62

Describe the audience.

Definition

Description should include

- audience characteristics
 - behavior
 - culture
 - age
 - socioeconomic factors
 - geographical factors
- market forces
 - opportunities
 - competition
 - market saturation
- strengths, weaknesses, opportunities, and threats (SWOT) analyses.

Process/Skill Questions

- Why is it important to define one's target audience?

- How does the audience affect the design and production of a game?

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Task Number 63

Identify the components of a game engine.

Definition

Identification could include

- asset creation
- coding console
- 2D sprite animation system
- testing tools
- viewport
- 3D sound editing console
- 3D skeletal mesh and animation system
- 3D material editor
- 3D user interface editor
- 3D static mesh editor
- 3D landscape editor.

Process/Skill Questions

- Why is the choice of game engine important?
- What is the purpose of a game engine?

Task Number 64

Plan a timeline for production.

Definition

Planning a timeline should include

- Gantt chart
- release date/deadlines
- team roles

- components of production (i.e., game design life cycle).

Process/Skill Questions

- What is a Gantt chart? How does it help in planning game production?
- What are consequences of missing a deadline?
- How does the calendar affect projected release dates?

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Task Number 65

Create a flow chart for game progression.

Definition

Creation of a flow chart should include progression of the game based on conditions of gameplay (e.g., advancement, if-then statements).

Process/Skill Questions

- Why are flow charts important?
- What are examples of conditions of gameplay?
- How will the flow chart aid the creator in game development?
- How does the flow chart demonstrate milestones or choices within a game?

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17. Information and Communication Technologies

Creating Assets

Task Number 66

Build a playable or nonplayable actor.

Definition

Building should include the concept that, in this context, actor refers to any playable or nonplayable object that interacts with other objects in the game (e.g., the actor could be a human, a spaceship, a ball).

Process/Skill Questions

- What is an actor, and what is the difference between a playable actor and a nonplayable actor?
 - What are some examples of playable actors and of nonplayable actors?
 - What interactions can occur between actors? Provide examples.
-

Task Number 67

Build an object.

Definition

Building should include the concept that an object refers to anything in a game that does not interact with other objects or actors.

Building could also include

- consideration of genre and story
- physics (e.g., gravity)
- physical characteristics
 - geometry
 - scale
 - color
 - resolution
 - exposure.

Process/Skill Questions

- How can one differentiate between an actor and an object?
- What is the importance of including objects in games?

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Task Number 68

Create an environment.

Definition

Creation could include

- lighting
- foreground/background
- topography/terrain
 - urban
 - rural
 - reality-based
 - fantasy
- mood
- color scheme
- era
 - current
 - historical
 - futuristic
- time of day.

Process/Skill Questions

- How does the game environment enhance gameplay for the players?
- What are some different ways the developer can place a character in the environment?
Explain.

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Video Game Design

Task Number 69

Apply visual effects.

Definition

Application could include, but is not limited to,

- explosions
- precipitation
- auras
- glowing object effects
- animated textures
- magic effects
- fire.

Process/Skill Questions

- How do visual effects enhance the game and the story?
- How might inappropriate visual effects detract from a game?

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TSA Competitive Events

Video Game Design

Task Number 70

Apply audio effects.

Definition

Application could include the creation and manipulation of audio effects appropriate to the game.

Process/Skill Questions

- How can audio effects influence how a player reacts in a game?

- What cues can be given/received?
- Why are audio effects important to consider in game development?
- What file types/extensions are associated with audio effects?

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17. Information and Communication Technologies

TSA Competitive Events

Video Game Design

Task Number 71

Develop a user interface.

Definition

Development should include defining the characteristics of user interface, to include communication and feedback to the player.

Process/Skill Questions

- What information is important to communicate to the player (e.g., score)?
- How does genre influence the location/size of the user interface?

TSA Competitive Events

Video Game Design

Creating a Game Build

Task Number 72

Integrate assets into a game.

Definition

Integration may include

- actors
- objects
- environment
- visual effects
- audio effects
- user interface.

Process/Skill Questions

- What is the process for integrating game assets?
- How is the integration of game assets influenced by the platform/tools a developer is using?

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TSA Competitive Events

Video Game Design

Task Number 73

Implement interactivity into a game.

Definition

Implementation could include

- scripting/coding
- applying existing code
- utilizing flowcharts.

Process/Skill Questions

- What does the backend of the code look like?
- How can flow charts assist with implementing interactivity?

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17. Information and Communication Technologies

TSA Competitive Events

Video Game Design

Performing Quality Assurance

Task Number 74

Perform alpha testing.

Definition

Performance of alpha testing should include

- in-house testing
- iterative testing (improvements would be made and additional testing would occur as needed)
- identification and correction of game performance
- identification and correction of major errors.

Process/Skill Questions

- Why is it important to continuously test a game?
- What is iterative testing?
- What consequences could a game publisher face for failing to test a game?

Task Number 75

Perform beta testing.

Definition

Performance of beta testing should include

- a group of non-developers
- iterative testing (improvements would be made and additional testing would occur as needed)
- testing for accessibility.

Process/Skill Questions

- Why is it important that non-developers be involved in beta testing?
- What does beta refer to?
- What types of errors are commonly found during a beta test?

Task Number 76

Examine beta testing feedback/results.

Definition

Examination should include

- error report
- anecdotal feedback
- game performance assessment
- feedback relating to ergonomics.

Process/Skill Questions

- What does the feedback reveal about the game?
- What might a future version of a game include, based on the examination of beta testing feedback?
- What are ergonomics, and how do they affect the user experience?

Exploring Game Publication

Task Number 77

List ways that games are published.

Definition

List could include publishing options such as

- using distribution channels (e.g., brick and mortar vs. e-commerce)
- determining format (e.g., disc vs. download)
- choosing platform(s) (e.g., mobile vs. console).

Process/Skill Questions

- What is an advantage/disadvantage of each publishing option?
- What are current trends in game publication?
- How does the type of game affect how a developer chooses to publish it?

Task Number 78

Explain digital rights management (DRM).

Definition

Explanation should include the concept that DRM protects game developers from the unauthorized use and/or redistribution of intellectual property.

Process/Skill Questions

- What is DRM and why is it important?
- What are the consequences of a violation of DRM from the developer's perspective?

Task Number 79

Define *porting*.

Definition

Definition should include the concept that porting is the movement of a game from one platform to another.

Process/Skill Questions

- What does porting mean?
- Why would a game be ported?

Capturing the Market

Task Number 80

List marketing options.

Definition

List should include

- social media
- blogs/websites
- conventions
- corporate affiliations
- print advertising
- television
- crowdsourced funding
- vendors/retailers.

Process/Skill Questions

- How does marketing affect profit?
- What are trends in marketing?
- What new avenues exist?

Task Number 81

Evaluate the influence of marketing on the success of a game.

Definition

Evaluation could include

- historical case studies
- importance of reaching a target market
- comparison of successful vs. unsuccessful marketing
- importance of brand and reputation to marketing success/sales.

Process/Skill Questions

- What lessons can be learned by examining traditional marketing strategies and emerging marketing strategies?
- What strategies are most successful for marketing to various demographics?
- How can brand recognition increase sales?

Task Number 82

Create marketing materials.

Definition

Creation of marketing materials could include

- visuals
 - logo
 - graphics on packaging
- advertising copy (e.g., game description)
 - keywords
- videos (e.g., game trailer, commercial, paid YouTube review).

Process/Skill Questions

- What marketing materials are necessary to advertise a game?
- What graphic elements add to or detract from a game's presentation to its target audience?
- How does marketing material reflect a developer's game?

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17. Information and Communication Technologies

Task Number 83

Research economic principles as they relate to the marketing of games.

Definition

Research should include profit/cost considerations (e.g., subscription-based pricing models vs. traditional retail pricing models).

Process/Skill Questions

- What is the effect of subscription-based pricing models on new and emerging companies?
- Why might a company choose to give away its game and opt instead to offer in-game purchases?

Ensuring Career Readiness

Task Number 84

Update a multimedia portfolio.

Definition

Update could include

- an updated résumé
- work samples
 - screen shots
 - descriptions
 - storyboards
 - game/game files
- illustrating the student's knowledge, skills, and abilities.

Process/Skill Questions

- What is the value of a multimedia portfolio?
- What are key elements that need to be included in one's multimedia portfolio?

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TSA Competitive Events

Video Game Design

Task Number 85

Outline a chosen career pathway in game design and development.

Definition

Outline should include

- training
- certifications
- postsecondary education
- salary range
- job outlook
- industry trends and needs
- career mobility/advancement opportunities.

Teachers resource:

[Virginia's Education Wizard](#)
[GameDevMap](#)

Note: gamedevmap is a living map and catalog of game development organizations.

Process/Skill Questions

- What careers are currently available for a person interested in game design and development?
- What personal characteristics and job skills are necessary for a job in game design and development?
- What are sources of education and training to prepare a person for a career in game design or development?
- How does a career in game design compare with a career in game development?

Task Number 86

Describe the process and requirements for obtaining industry certifications related to the Game Design and Development, Advanced course.

Definition

Description should include a list of industry certifications related to the Game Design and Development, Advanced course and the process/requirements for obtaining the certifications from

- official websites of the testing organization/vendor
- materials from publishers that have developed practice materials and tests based on information from the testing organization/vendor
- information from certified instructors or industry-certified professionals
- information in the Course Description section of this document.

Process/Skill Questions

- What certification might be a valuable addition to a game designer’s résumé or to a game developer’s résumé?
- How would one prepare to take a certification examination?

SOL Correlation by Task

39	Analyze the elements of a successful game.	English: 10.5, 11.5, 12.5
40	Explain the effects of games on the user.	English: 10.5, 11.5, 12.5
41	Explain the effects of games on society.	English: 10.5, 11.5, 12.5
42	Identify the purposes of games.	English: 10.5, 11.5, 12.5
43	Define the <i>culture</i> of a game.	English: 10.3, 11.3, 12.3
44	Investigate accessibility guidelines for game platforms.	English: 10.8, 11.8, 12.8
45	Adhere to intellectual property laws.	English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8
46	Interpret the Entertainment Software Rating Board (ESRB) rating system.	English: 10.5, 11.5, 12.5
47	Explain end user license agreements (EULA).	English: 10.5, 11.5, 12.5
48	Summarize the security concerns of the user and developer.	English: 10.5, 11.5, 12.5
49	Differentiate among game genres.	English: 10.5, 11.5, 12.5
50	Compare game platforms.	English: 10.5, 11.5, 12.5
51	Describe the components of storytelling.	English: 10.5, 11.5, 12.5
52	Develop a storyline.	English: 10.5, 11.5, 12.5
53	Apply a perspective.	English: 10.5, 11.5, 12.5
54	Develop a setting.	English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5
55	Develop characters and assets.	English: 10.5, 10.6, 10.7, 11.5, 11.6, 11.7, 12.5, 12.6, 12.7
56	Create a storyboard.	English: 10.1, 11.1, 12.1
57	Present a narrative/concept.	English: 10.1, 11.1, 12.1

58	Perform the role of a team member.	
59	Collaborate with team members in performing different game design roles.	English: 10.1, 11.1, 12.1
60	Evaluate role as a team member.	English: 10.5, 11.5, 12.5
61	Implement the elements of a successful game.	English: 10.5, 11.5, 12.5
62	Describe the audience.	English: 10.5, 11.5, 12.5
63	Identify the components of a game engine.	English: 10.2, 10.5, 11.2, 11.5, 12.2, 12.5
64	Plan a timeline for production.	English: 10.1, 11.1, 12.1
65	Create a flow chart for game progression.	English: 10.1, 11.1, 12.1
66	Build a playable or nonplayable actor.	
67	Build an object.	Mathematics: G.3, G.14
68	Create an environment.	English: 10.1, 11.1, 12.1
69	Apply visual effects.	English: 10.5, 11.5, 12.5
70	Apply audio effects.	English: 10.5, 11.5, 12.5
71	Develop a user interface.	English: 10.1, 10.3, 11.1, 11.3, 12.1, 12.3 Mathematics: COM.10
72	Integrate assets into a game.	English: 10.2, 11.2, 12.2
73	Implement interactivity into a game.	English: 10.5, 10.6, 11.5, 11.6, 12.5, 12.6
74	Perform alpha testing.	English: 10.5, 11.5, 12.5
75	Perform beta testing.	English: 10.5, 11.5, 12.5
76	Examine beta testing feedback/results.	English: 10.5, 11.5, 12.5
77	List ways that games are published.	English: 10.5, 11.5, 12.5
78	Explain digital rights management (DRM).	English: 10.5, 11.5, 12.5
69	Define <i>porting</i> .	English: 10.3, 11.3, 12.3
80	List marketing options.	English: 10.5, 11.5, 12.5 History and Social Science: VUS.1, VUS.13, VUS.14
81	Evaluate the influence of marketing on the success of a game.	English: 10.5, 11.5, 12.5
82	Create marketing materials.	English: 10.1, 11.1, 12.1
83	Research economic principles as they relate to the marketing of games.	English: 10.8, 11.8, 12.8
84	Update a multimedia portfolio.	English: 10.6, 10.7, 11.6, 11.7, 12.6, 12.7
85	Outline a chosen career pathway in game design and development.	English: 10.6, 10.7, 11.6, 11.7, 12.6, 12.7
86	Describe the process and requirements for obtaining industry certifications related to the Game Design and Development, Advanced course.	English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8

Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- 3D Visualization & Animation Examination
- Autodesk Certified Professional Examinations
- Autodesk Certified User Examinations
- Unity Certified User Examination
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: *A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.*

- Game Design and Development (8400/36 weeks)
- JAVA Programming (6661/36 weeks)
- Programming (6640/36 weeks)
- Programming, Advanced (6641/36 weeks)

Career Cluster: Arts, Audio/Video Technology and Communications	
Pathway	Occupations
Audio and Video Technology and Film	Audio-Video Designer, Engineer Multimedia Artist, Animator Producer Sound Engineering Technician
Journalism and Broadcasting	Art Director
Telecommunications	Computer Programmer
Visual Arts	Illustrator

Career Cluster: Education and Training	
Pathway	Occupations
Administration and Administrative Support	Training and Development Manager
Professional Support Services	Instructional Developer
Teaching and Training	Secondary School Teacher

Career Cluster: Information Technology	
Pathway	Occupations
Information Support and Services	Applications Integrator Data Modeler Multimedia Artist, Animator Software Test Engineer Technical Writer
Network Systems	Computer Software Engineer Software Test Engineer Sound Engineering Technician
Programming and Software Development	Applications Integrator Game Designer, Programmer Multimedia Artist, Animator Programmer Project Manager Software Applications Engineer
Web and Digital Communications	Applications Integrator Game Designer, Programmer Multimedia Artist, Animator Project Manager

Career Cluster: Science, Technology, Engineering and Mathematics	
Pathway	Occupations
Engineering and Technology	Computer Programmer Computer Software Engineer Engineering Manager Project Manager Quality Engineer Systems Analyst Technical Writer