Georgia CTAE

Game Design: Animation and Simulation (11.42900) (2015)

Adopted 2015

Demonstrate employability skills required by business and industry. IT-GDAS-1

1. **Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.** IT-GDAS-1.1
2. **Demonstrate creativity by asking challenging questions and applying innovative procedures and methods.** IT-GDAS-1.2
3. **Exhibit critical thinking and problem-solving skills to locate, analyze and apply information in career planning and employment situations.** IT-GDAS-1.3
4. **Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.** IT-GDAS-1.4
5. **Apply the appropriate skill sets to be productive in a changing, technological, diverse workplace to be able to work independently and apply team-work skills.** IT-GDAS-1.5
6. **Present a professional image through appearance, behavior, and language.** IT-GDAS-1.6

Demonstrate conceptual understanding of the game design process. IT-GDAS-2

1. **Identify the primary steps in the design process (e.g., conceptualize, prototype, test, analyze).** IT-GDAS-2.1
2. **Evaluate basic gameplay from an existing game.** IT-GDAS-2.2
3. **Compare and contrast the narratives in gameplay and explain how and when the storyline could pertain to game design.** IT-GDAS-2.3
4. **Evaluate and describe various 2D & 3D, single & multi-user genre in games.** IT-GDAS-2.4
5. **Plan and layout the steps needed to execute a team project, from skills to dependencies and parallelization of tasks.** IT-GDAS-2.5

Apply complex and abstract thinking to

1. **Introduce script binding, components, and prefabricated objects to projects.** IT-GDAS-3.1

programming and scripting. IT-GDAS-3	2. **Determine appropriate programming and scripting languages to create desired game mechanics, control the environment, user interface (UI), and gameplay.** IT-GDAS-3.2
	3. **Demonstrate an understanding of "if" and "switch" statements.** IT-GDAS-3.3
	4. **Demonstrate an understanding of states for game, player, item, and other objects in the game universe.** IT-GDAS-3.4
	5. **Demonstrate an understanding of loops to manage recurring events.** IT-GDAS-3.5
	6. **Retarget motion data and animation setups between character rigs.** IT-GDAS-3.6
	7. **Import and use Motion Capture (Mocap) data to drive character animation.** IT-GDAS-3.7
	8. **Demonstrate an understanding of Object Oriented Programming.** IT-GDAS-3.8
	9. **Demonstrate an understanding of the mathematical concepts, logic, and syntax of programming languages.** IT-GDAS-3.9
	10. **Compare and contrast game creation tools including scripting languages, extensibility, 2D/3D support and others.** IT-GDAS-3.10
Analyze and synthesize the relationship of mathematics to game design. IT-GDAS-4	1. **Use algebraic, geometric, and trigonometric relationships to define game object characteristics and properties as well as Heads-Up Display (HUD) interface placement and scaling.** IT-GDAS-4.1
	2. **Demonstrate functions of linear algebra and vector mathematics (dot product, cross product, quaternions, etc.) to determine character perspective and field of view.** IT-GDAS-4.2
	3. **Explain how quaternion calculations are used in video game development.** IT-GDAS-4.3
	4. **Apply mathematical concepts to interactive application and video game design.** IT-GDAS-4.4
	5. **Explain the use of collision geometry and "hit testing" for physics-based interactions and programming triggers.** IT-GDAS-4.5
Construct two-dimensional models using concepts of physics. IT-GDAS-5	1. **Explore the phenomena and apply Newtonian physics to static & dynamic systems for animation.** IT-GDAS-5.1
	2. **Explore mass, velocity, acceleration, torque, force, and other related measurements.** IT-GDAS-5.2
	3. **Use physics to create realistic motion of objects and characters (gravity, angular momentum, momentum, friction).** IT-GDAS-5.3

	4. Apply the use of colliders and rigged bodies (kinesthetics). IT-GDAS-5.4
	5. Demonstrate a working knowledge of two dimensional digital bitmap art tools. IT-GDAS-5.5
	6. Demonstrate a working knowledge of two dimensional digital vector art tools. IT-GDAS-5.6
Develop three-dimensional models, backgrounds, and scenes. IT-GDAS-6	1. Create 3D Models with appropriate highlights and shading. IT-GDAS-6.1
	2. Determine the effect of various camera angles and emphasize perspective. IT-GDAS-6.2
	3. Demonstrate a working knowledge of 3D modeling & animation tools. IT-GDAS-6.3
Analyze 2D/3D character animation and character controls. IT-GDAS-7	1. Create character states, and transition between states when a specified event occurs. IT-GDAS-7.1
	2. Manipulate state-based animations and transitions. IT-GDAS-7.2
	3. Define volumes and entrance/exit events. IT-GDAS-7.3
	4. Create fire particle events, audio events, and object state events (e.g., inventory levels, timers). IT-GDAS-7.4
	5. Construct a 2D and 3D maze and maneuver through it in first and third person as a character. IT-GDAS-7.5
Explain how to create an Augmented Reality experience. IT-GDAS-8	1. Understand geo-location, geo-fencing principles, and location event models. IT-GDAS-8.1
	2. Understand and implement environmental events such as camera inputs, accelerometers, and audio inputs. IT-GDAS-8.2
	3. Create a map and navigation for UI (user interface) with transparent overlays superimposed on real world sensors. IT-GDAS-8.3
	4. Define how to create an Augmented Reality experience. IT-GDAS-8.4
	5. Create an asset to use in your Augmented Reality experience (e.g., 3D Model, Animation). IT-GDAS-8.5
Design an augmented reality experience into a location-based game. IT-GDAS-9	1. Use the assets created in Standard 8 and incorporate into a location based game. IT-GDAS-9.1

Design and develop a game in teams. IT-GDAS-10

1. **Create a plan working with the skills of team members and the requirements of the game.** IT-GDAS-10.1
2. **Develop a solid game – building, versioning, debugging, and optimization.** IT-GDAS-10.2
3. **Create a hypothetical technology pipeline for an interactive application or video game project.** IT-GDAS-10.3

Deploy a student-team created game for beta testing. IT-GDAS-11

1. **Coordinate and produce a game that contains lighting and sound.** IT-GDAS-11.1
2. **Demonstrate a working knowledge of video capture, editing, and post-processing tools.** IT-GDAS-11.2
3. **Apply the correct graphic file formats and file interoperability.** IT-GDAS-11.3
4. **Apply video file formats and file interoperability.** IT-GDAS-11.4
5. **Apply audio file formats and file interoperability.** IT-GDAS-11.5
6. **Use interactive and real-time editing within the game.** IT-GDAS-11.6
7. **Deploy the game to a mobile device for testing and peer review.** IT-GDAS-11.7

IT-GDAS-12. **Examine how related student organizations are integral parts of career and technology education courses through leadership development, school and community service projects and competitive events.** IT-GDAS-12

1. **Explain the goals, mission, and objectives of the career-technical student organization (CTSO).** IT-GDAS-12.1
2. **Explore the impact and opportunities a student organization can develop to bring business and education together in a positive working relationship through innovative leadership and career development programs.** IT-GDAS-12.2
3. **Explore the local, state, and national opportunities available to students through participation in related student organization including but not limited to conferences, competitions, community service, philanthropy, and other CTSO activities.** IT-GDAS-12.3
4. **Explain how participation in career and technology education student organizations can promote lifelong responsibility for community service and professional development.** IT-GDAS-12.4
5. **Explore the competitive events related to the content of this course and the required competencies, skills, and knowledge for each related event for individual, team, and chapter competitions.** IT-GDAS-12.5