

Game Design

Level: 3

Career Cluster: Digital Technology

Program: Information Technology

Pathway(s): Coding

Course Catalog Description

This course introduces students to game design and interactive media, focusing on gameplay systems, coding, visual design, and user experience. Students design, test, and refine an original playable game while developing collaboration, problem-solving, and professional communication skills.

Course Summary

This course introduces students to the principles and practices of game design, development, and interactive media within the Information Technology pathway. Students examine how game mechanics, systems, storytelling, and user experience work together to create engaging and meaningful digital experiences. Through hands-on projects, students apply coding concepts such as variables, conditionals, loops, and event-driven programming to develop interactive gameplay elements and functional game systems. Emphasis is placed on the design process, as students create prototypes, conduct playtesting, analyze data, and implement iterative revisions to improve usability, balance, and overall player experience. Students also develop visual assets, user interfaces, and narrative elements that support gameplay and enhance communication with the player. In addition to technical skills, the course integrates collaboration, project management, and professional communication practices aligned to industry expectations. Students work in team-based production roles, participate in peer critiques, present design ideas, and maintain development documentation throughout the project lifecycle.

Notes

The updated course represents a significant shift from the previous model toward a more structured, industry-aligned, and outcomes-driven curriculum. The earlier course primarily focused on foundational skills such as basic game concepts, sprite creation, visual elements, and introductory programming, with students designing games through guided tasks like storyboards, simple coding, and asset creation. While it included elements of collaboration, research, and gameplay analysis, the emphasis was largely on discrete skills and tool-based learning rather than a cohesive development process. In contrast, the new course organizes learning into clearly defined units that reflect the full game development lifecycle, including systems design, coding, prototyping, playtesting, visual design, and professional practices such as project management and teamwork. The updated version places a much stronger emphasis on iterative design, data-informed decision-making, user experience, and industry-relevant workflows, culminating in a comprehensive final project where students design, develop, and present an original playable game.

Student Learning Outcomes

1. Career Exploration and Postsecondary Opportunities

Objective: *Students will analyze career pathways in information technology, exploring industry roles, workplace expectations, required education, certifications, professional organizations, and postsecondary opportunities available in Colorado in order to make informed academic and career decisions.*

- 1) Identify employment opportunities in various fields with a focus in the area of information technology
 - a. Recognize the work typically performed, tools and technology used, and nature of work environments
 - b. Identify potential certifications within the careers
 - c. Find membership organizations associated with the careers
 - d. Understand the necessary education associated within the careers
- 2) Define professionalism within the context of information technology
 - a. Criticism and evaluation
 - b. Presentation
 - c. Assessment
- 3) Recognize laws, regulations, and ethics significant to the fields of information technology
- 4) Identify postsecondary opportunities offered in the state of Colorado
 - a. Technical college, community college, 4-year institutions
 - b. Certificates, associates, bachelor, and advanced degree opportunities

2. Foundations of Game Design and Interactive Media

Objective: *Students will analyze the core components of successful games in order to explain how rules, mechanics, goals, feedback systems, and player experience shape interactive design.*

- 5) Define key game design terms including mechanics, dynamics, objectives, rules, constraints, and player feedback.
- 6) Classify major game genres and compare how genre conventions influence player interaction and design choices.
- 7) Analyze existing games to determine how story, challenge, pacing, and reward systems affect player engagement.
- 8) Evaluate games for age appropriateness, accessibility, usability, and ethical design considerations.
- 9) Interpret how target audience, platform, and player goals influence game design decisions.
- 10) Examine how player choice, feedback loops, and challenge levels contribute to overall game engagement.

3. Game Systems, Mechanics, and Player Experience

Objective: *Students will apply game design principles to develop mechanics and systems that support clear goals, balanced challenge, and a positive player experience.*

- 11) Design gameplay loops that include player actions, system responses, and measurable outcomes.

- 12) Construct levels, puzzles, or challenges that increase in complexity and maintain player engagement.
- 13) Differentiate between balanced and unbalanced gameplay using playtest evidence and user feedback.
- 14) Revise game mechanics to improve usability, fairness, and player motivation.
- 15) Analyze how game rules and resource systems shape player strategy and decision-making.
- 16) Evaluate game systems for clarity, consistency, and alignment with intended player experience.

4. Coding, Logic, and Interactive Development

Objective: *Students will develop and test coded game components in order to create functional interactive experiences that respond to player input and game events.*

- 17) Apply variables, conditionals, loops, functions, and events to create interactive gameplay behaviors.
- 18) Implement movement, scoring, timers, collision detection, and win or loss conditions in a digital game environment.
- 19) Debug scripts and logic errors by tracing code, testing outcomes, and refining program structure.
- 20) Document code and development decisions using comments, naming conventions, and version-ready organization.
- 21) Modify code structures to improve efficiency, readability, and game performance.
- 22) Test interactive features systematically to verify expected behavior across different gameplay scenarios.

5. Prototyping, Iteration, and Playtesting

Objective: *Students will create prototypes, gather evidence from playtesting, and evaluate design revisions in order to improve game functionality and user experience.*

- 23) Create low-fidelity and digital prototypes that communicate gameplay ideas and technical requirements.
- 24) Develop testing criteria to measure functionality, clarity, challenge, and player satisfaction.
- 25) Interpret playtesting data and feedback to identify patterns, bugs, and design improvements.
- 26) Justify revisions made to a prototype based on evidence collected during testing.
- 27) Organize playtesting observations into actionable categories such as bugs, balance issues, and usability concerns.
- 28) Formulate revision priorities based on testing data, project goals, and available development time.

6. Visual Design, Story, and User Interface

Objective: *Students will design visual and narrative elements that support gameplay, communicate information clearly, and enhance the overall player experience.*

- 29) Develop story concepts, characters, settings, or themes that align with a game's purpose and intended audience.

- 30) Create visual assets, interface elements, or layout plans that improve navigation and readability.
- 31) Analyze how color, typography, sound, and visual hierarchy affect user attention and immersion.
- 32) Evaluate interface choices and revise menus, instructions, and feedback systems for clarity and accessibility.
- 33) Design interface and visual elements that reinforce theme, readability, and player navigation.
- 34) Critique visual and narrative choices for coherence, audience appeal, and support of gameplay goals.

7. Work-Based Learning

Objective: *Students will apply professional practices used in the game and software industries in order to strengthen workplace readiness, project management, and communication skills.*

- 35) Demonstrate professional communication through design pitches, progress updates, peer critiques, and project documentation.
- 36) Use project planning tools such as timelines, task lists, sprint goals, or production checkpoints to manage work.
- 37) Collaborate with peers in assigned production roles to complete shared design and development tasks.
- 38) Evaluate how industry feedback, client needs, or user requirements influence design decisions and project outcomes.
- 39) Prepare professional project artifacts such as design briefs, milestone updates, and presentation materials.
- 40) Demonstrate adaptability by revising plans and responsibilities in response to project constraints or feedback.

8. Leadership

Objective: *Students will demonstrate leadership behaviors by contributing responsibly to team goals, reflecting on performance, and supporting an inclusive and productive development process.*

- 41) Model accountability, initiative, and time management when completing individual and team responsibilities.
- 42) Facilitate constructive feedback sessions by asking clarifying questions, responding professionally, and incorporating suggestions.
- 43) Assess personal contributions and team effectiveness using reflection, goal setting, and evidence from project work.
- 44) Advocate for inclusive design practices that support diverse users, perspectives, and player needs.
- 45) Demonstrate ethical leadership by promoting respectful collaboration, digital citizenship, and responsible decision-making.
- 46) Develop strategies for resolving conflict, sharing responsibility, and maintaining team productivity during complex projects.

9. Final Assessment Project: Original Playable Game

Objective: *Students will design, develop, test, refine, and present an original playable game that demonstrates mastery of semester course outcomes in game design, coding, and professional practice.*

- 47) Propose and justify an original game concept that includes audience, goals, mechanics, theme, and technical requirements.
- 48) Develop a playable prototype or completed game that incorporates coding, interaction, visual design, and user feedback.
- 49) Compile production artifacts such as concept sketches, design documents, testing notes, revision logs, and code samples.
- 50) Present and defend final design decisions using evidence from the development process, playtesting, and reflection on project growth.
- 51) Evaluate the final game against defined criteria for functionality, design quality, usability, and audience experience.
- 52) Produce a reflective summary that explains project challenges, solutions, growth, and future improvements.

10. Career and Technical Student Organizations

Objective: *Using the CTSO Resource Document, chapter activities will provide some of the best opportunities CTSO members will have to learn by doing. A successful program of work creates a positive learning atmosphere in the classroom. CTSO members learn how to accept responsibility, work as a team, manage a budget, and handle success and failure. Per the CTE Admin Handbook, CTSOs are embedded into curriculum.*

Professional Development

Prepare each member for entry into the workforce and provide a foundation for success in a career. Becoming a professional does not stop with acquiring a skill, but involves an increased awareness of the meaning of good citizenship and the importance of labor and management in the world of work.

Community Service

Promote and improve goodwill and understanding among all segments of the community through services donated by CTSO chapters, and to instill in its members a lifetime commitment to community service.

Business and Industry Connections

Increase awareness of quality job practices and attitudes, and increase the opportunities for employer engagement and eventual employment.

Financial Leadership

Plan and participate in activities to allow all members to carry out the chapter's projects. Educate members on their own personal finance for current and future success.

Public Relations

Make the general public aware of the good work that students in career and technical education are doing to better themselves and their community, state, nation, and world.

Social Activities

To increase cooperation in the school and community through activities that allow CTSO members to get to know each other in something other than a business or classroom setting.

Academic Standards Alignment

Colorado CTE courses are required to integrate academic and essential skills into course content. The following academic standards have been identified as aligned to this course and should be integrated throughout instruction.

[CO CTE Academic Standards Resources](#) (Rubrics, integration strategies, etc)

[CDE Colorado Academic Standards Online](#) (Online standards lookup tool)

Note: Mathematics and Science standards will be added in the future. Visit the [Colorado Academic Standards](#) page for the most current version.

Reading, Writing and Communicating Crosswalk

Course: Game Design

Colorado Academic Standards – Reading, Writing, and Communicating

Standard	Prepared Graduate Competency	Description	Course Evidence / Alignment
Standard 1: Oral Expression and Listening	Prepared Graduate 1 – Collaboration	Collaborate effectively as group members or leaders who listen actively and respectfully; pose thoughtful questions, acknowledge the ideas of others; and contribute ideas to further the group's attainment of an objective.	Strongly aligned through Work-Based Learning and Leadership outcomes requiring collaboration, peer critique, conflict resolution, and team roles.
Standard 1: Oral Expression and Listening	Prepared Graduate 2 – Oral Presentations	Deliver effective oral presentations for varied audiences and varied purposes.	Aligned through design pitches, progress updates, and final presentations where students present and defend design decisions.
Standard 2: Reading for All Purposes	Prepared Graduate 4 – Informational Texts	Read a wide range of informational texts to build knowledge and to better understand the human experience.	Aligned through analysis of game design concepts, systems, and industry expectations using informational content.

Standard 2: Reading for All Purposes	Prepared Graduate 5 – Language in Context	Understand how language functions in different contexts, command word-learning strategies, and make effective choices for meaning or style.	Aligned through use of technical vocabulary (game mechanics, systems, coding terms) and communication through documentation and critique.
Standard 3: Writing and Composition	Prepared Graduate 6 – Craft Arguments	Craft arguments using techniques specific to the genre.	Aligned through justification of design decisions, revision priorities, and defending final projects with evidence.
Standard 3: Writing and Composition	Prepared Graduate 7 – Informational Writing	Craft informational/explanatory texts using techniques specific to the genre.	Strong alignment through design documents, code documentation, project artifacts, and development explanations.
Standard 3: Writing and Composition	Prepared Graduate 8 – Craft Narratives	Craft narratives using techniques specific to the genre.	Directly aligned through development of story concepts, characters, themes, and narrative elements in games
Standard 3: Writing and Composition	Prepared Graduate 9 – Writing Process	Demonstrate mastery of their own writing process with clear, coherent, and error-free polished products.	Aligned through iterative design, documentation, reflection, and revision logs demonstrating polished final products.
Standard 4: Research Inquiry and Design	Prepared Graduate 10 – Research and Ethics	Gather information from a variety of sources; analyze and evaluate its quality and relevance; and use it ethically to answer complex questions.	Strong alignment through playtesting data analysis, research into careers, evaluation of systems, and evidence-based revision decisions.

Free Resource Links

1. Career Exploration and Postsecondary Opportunities

- O*NET OnLine Career Exploration Tool (career pathways, job outlook, IT careers)
<https://www.onetonline.org/>
- CyberSeek Career Pathway Tool (technology careers, certifications, workforce data)
<https://www.cyberseek.org/pathway.html>
- Bureau of Labor Statistics Occupational Outlook Handbook (career research, salary data, education requirements)
<https://www.bls.gov/ooh/>
- CTE Learn Career Clusters Resource Library (career pathways, industry expectations, certifications)
<https://www.ctelearn.org/>

2. Foundations of Game Design and Interactive Media

- Game Design Concepts by Ian Schreiber (game mechanics, systems thinking, design principles)
<https://gamedesignconcepts.wordpress.com/>
- Extra Credits YouTube Channel (game design theory, player experience, ethics)
<https://www.youtube.com/user/ExtraCreditz>
- Game Developer Resources Library (design basics, genres, concepts)
<https://www.gamedeveloper.com/>
- MIT OpenCourseWare Game Design (interactive systems, player engagement, design analysis)
<https://ocw.mit.edu/>

3. Game Systems, Mechanics, and Player Experience

- Machinations Game Systems Design Tool (systems thinking, game loops, balancing)
<https://machinations.io/>
- Critical Gaming Project (game analysis, systems evaluation, player experience)
<https://critical-gaming.com/>
- Game Balance Concepts Article Library (mechanics, systems, balancing strategies)
<https://gamebalanceconcepts.wordpress.com/>
- Ludology Game Studies Resources (player experience, systems analysis)
<http://www.ludology.org/>

4. Coding, Logic, and Interactive Development

- Scratch Programming Platform (coding fundamentals, logic, interactive development)
<https://scratch.mit.edu/>
- Unity Learn Tutorials (game coding, scripting, development workflows)
<https://learn.unity.com/>
- Khan Academy Programming Course (JavaScript, logic, debugging)
<https://www.khanacademy.org/computing/computer-programming>
- Codecademy Learn to Code (programming concepts, variables, loops, functions)
<https://www.codecademy.com/>

5. Prototyping, Iteration, and Playtesting

- Google Design Sprint Kit (prototyping, testing, iteration strategies)
<https://designsprintkit.withgoogle.com/>
- PlaytestCloud Blog (playtesting methods, user feedback, usability testing)
<https://www.playtestcloud.com/blog/>
- Interaction Design Foundation Resources (prototyping, usability, iteration)
<https://www.interaction-design.org/>
- Nielsen Norman Group UX Research Articles (testing, user experience evaluation)
<https://www.nngroup.com/articles/>

6. Visual Design, Story, and User Interface

- Canva Design School (visual design, layout, typography, color theory)
<https://www.canva.com/learn/>
- Adobe Creative Cloud Tutorials (visual design, UI design, storytelling)
<https://helpx.adobe.com/creative-cloud/tutorials-explore.html>
- Google Material Design Guidelines (user interface, usability, visual hierarchy)
<https://material.io/design>
- Storytelling for Interactive Media Resource Hub (narrative design, character development)
<https://www.narrativedesign.net/>

7. Work-Based Learning

- Trello Project Management Tool (project planning, task tracking, collaboration)
<https://trello.com/>
- Asana Work Management Resource Center (workflow management, collaboration, productivity)
<https://asana.com/resources>
- MindTools Professional Skills Library (communication, teamwork, leadership skills)
<https://www.mindtools.com/>
- Indeed Career Guide (workplace skills, communication, professionalism)
<https://www.indeed.com/career-advice>

8. Leadership

- Center for Creative Leadership Resources (leadership development, teamwork, communication)
<https://www.ccl.org/articles/>
- Edutopia Leadership and Collaboration Strategies (student leadership, teamwork, feedback)
<https://www.edutopia.org/>
- Harvard Business Review Leadership Articles (leadership skills, team dynamics, communication)
<https://hbr.org/topic/leadership>

- Toastmasters Public Speaking Resources (presentation skills, communication, confidence)
<https://www.toastmasters.org/resources>

9. Final Assessment Project Original Playable Game

- itch.io Game Publishing Platform (game development, publishing, portfolio building)
<https://itch.io/>
- Global Game Jam Resources (game creation, collaboration, rapid prototyping)
<https://globalgamejam.org/resources>
- Unity Play Showcase (game portfolios, examples, development inspiration)
<https://play.unity.com/>
- GameMaker Studio Tutorials (game creation, prototyping, coding projects)
<https://gamemaker.io/en/tutorials>



Technology Student Association – National Competitive Events

Video Game Design

Objective: *Students will design, develop, test, document, and present an original video game that meets TSA Video Game Design requirements for gameplay, technical quality, creativity, documentation, and presentation.*

- Research the annual TSA Video Game Design theme and develop an original game concept.
- Plan gameplay, rules, goals, mechanics, characters, levels, scoring, user interaction, and technical requirements.
- Develop a playable game using appropriate programming, game engine, or interactive media tools.
- Apply programming concepts such as variables, conditionals, loops, functions, objects, collision logic, animation, and user input.
- Test and refine the game to improve functionality, usability, balance, clarity, and player experience.
- Prepare documentation that explains the game concept, development process, technical tools, testing, and revisions.
- Present the game to judges and explain design decisions, technical implementation, and response to the annual theme.

Resources

- Technology Student Association – Video Game Design competition guidelines
<https://tsaweb.org/competitions-programs/tsa/themes-problems>
- Unity Learn – Game development tutorials
<https://learn.unity.com/>
- Godot Engine Documentation
<https://docs.godotengine.org/>
- Scratch – Beginner-friendly interactive programming and game design
<https://scratch.mit.edu/>



Technology Student Association – National Competitive Events

Virtual Reality Simulation (VR)

Objective: *Students will design, develop, document, and present a virtual reality simulation that uses 3D graphics and immersive design to communicate a scientific, technical, or conceptual topic aligned with TSA Virtual Reality Simulation requirements.*

- Research the annual TSA Virtual Reality Simulation theme and identify a topic, concept, or process that can be effectively communicated through VR.
- Plan the simulation using sketches, storyboards, user-flow diagrams, scene layouts, or interaction maps.
- Develop a virtual environment using appropriate 3D modeling, game engine, animation, sound, and interaction tools.
- Apply design principles related to immersion, navigation, user experience, visual clarity, pacing, and technical communication.
- Create a two-to-three-minute recorded simulation that demonstrates the VR experience and communicates the selected concept.
- Prepare a documentation portfolio that explains research, purpose, design process, software/hardware used, development decisions, and revisions.
- Present the VR simulation using appropriate hardware and explain the purpose, value, research, and design process during the interview.

Resources

- Technology Student Association – Virtual Reality Simulation (VR) competition guidelines
<https://tsaweb.org/competitions-programs/tsa/themes-problems>
- Unity Learn – VR and interactive 3D development tutorials
<https://learn.unity.com/>
- Unreal Engine – Virtual reality development resources
<https://dev.epicgames.com/documentation/en-us/unreal-engine/virtual-reality-development-in-unreal-engine>
- Blender – 3D modeling and animation software
<https://www.blender.org/>



Technology Student Association – National Competitive Events

Software Development

Objective: *Students will design, develop, document, test, and present a software application that responds to the annual TSA Software Development challenge.*

- Analyze the annual TSA Software Development challenge and identify the intended users, purpose, and functional requirements.
- Plan the software application using appropriate design tools such as pseudocode, flowcharts, diagrams, wireframes, or class structures.
- Develop a functioning software product using programming practices appropriate to the selected platform.
- Create documentation that explains the software purpose, development process, features, code structure, testing, and revisions.
- Apply quality assurance practices through testing, debugging, and refinement.
- Prepare a presentation or demonstration that explains the software solution and development decisions.
- Evaluate the final software using TSA criteria for functionality, design quality, documentation, usability, and presentation.

Resources

- Technology Student Association – Software Development competition guidelines
<https://tsaweb.org/competitions-programs/tsa/themes-problems>
- GitHub Docs – Version control and project collaboration
<https://docs.github.com/>
- Replit – Browser-based coding environment
<https://replit.com/>
- Visual Studio Code Documentation
<https://code.visualstudio.com/docs>