GAME DESIGN AND DEVELOPMENT
ACTIVITY COURSE CODE: 5352

COURSE DESCRIPTION: Game Design and Development is a course covering major aspects of game design including character and world development, game playing, game genres, and theories and principles of game design. Students will gain hands-on experience in simple game development. Concepts and practices will be explored to help students decide if they are interested in pursuing careers in game programming.

OBJECTIVE: Given the necessary equipment, supplies, and appropriate software, the student will be prepared to engage in further game development training.

COURSE CREDIT: 1 Carnegie unit

RECOMMENDED GRADE LEVELS: 11–12

PREREQUISITE: Teacher-determined, based on game development platform

COMPUTERS REQUIRED: one computer per student

RECOMMENDED SOFTWARE RESOURCES:

Gamemaker, XNA, Unreal Game Engine, Games Factory, Game Salad, Kodu, Flash, Unity, Objective C, Xcode, Python, Visual Basic, C#, Java, Ignition Game Engine (using Maya or 3D Studio Max), Alice

A. SAFETY

1. Review school safety policies and procedures.
2. Review classroom safety rules and procedures.
3. Review safety procedures for using equipment in the classroom.
4. Identify major causes of work-related accidents in office environments.
5. Demonstrate safety skills in an office/work environment.

B. STUDENT ORGANIZATIONS

1. Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
2. Explain how CTSOs are integral parts of specific clusters, majors, and/or courses.
3. Explain the benefits and responsibilities of being a member of a CTSO.
4. List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5. Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.

C. TECHNOLOGY KNOWLEDGE

1. Demonstrate proficiency and skills associated with the use of technologies that are common to a specific occupation.
2. Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes.
3. Identify potential abuse and unethical uses of laptops, tablets, computers, and/or networks.
4. Explain the consequences of social, illegal, and unethical uses of technology (e.g., piracy; illegal downloading; licensing infringement; inappropriate uses of software, hardware, and mobile devices in the work environment).
5. Discuss legal issues and the terms of use related to copyright laws, fair use laws, and ethics pertaining to downloading of images, photographs, documents, video, sounds, music, trademarks, and other elements for personal use.
6. Describe ethical and legal practices of safeguarding the confidentiality of business-related information.
7. Describe possible threats to a laptop, tablet, computer, and/or network and methods of avoiding attacks.

D. PERSONAL QUALITIES AND EMPLOYABILITY SKILLS

1. Demonstrate punctuality.
2. Demonstrate self-representation.
3. Demonstrate work ethic.
4. Demonstrate respect.
5. Demonstrate time management.
6. Demonstrate integrity.
7. Demonstrate leadership.
8. Demonstrate teamwork and collaboration.
9. Demonstrate conflict resolution.
10. Demonstrate perseverance.
11. Demonstrate commitment.
12. Demonstrate a healthy view of competition.
13. Demonstrate a global perspective.
14. Demonstrate health and fitness.
15. Demonstrate self-direction.
16. Demonstrate lifelong learning.

E. PROFESSIONAL KNOWLEDGE

1. Demonstrate effective speaking and listening skills.
2. Demonstrate effective reading and writing skills.
3. Demonstrate mathematical reasoning.
4. Demonstrate job-specific mathematics skills.
5. Demonstrate critical-thinking and problem-solving skills.
6. Demonstrate creativity and resourcefulness.
7. Demonstrate an understanding of business ethics.
8. Demonstrate confidentiality.
9. Demonstrate an understanding of workplace structures, organizations, systems, and climates.
10. Demonstrate diversity awareness.
11. Demonstrate job acquisition and advancement skills.
12. Demonstrate task management skills.
13. Demonstrate customer-service skills.

F. GAME DESIGN (INTEGRATED INTO GAME DEVELOPMENT)

INTRODUCTION TO GAMES

1. Describe different gaming genres.
2. Identify game terminology.
3. Categorize games by appropriate genre.
4. Define the evolution of gaming.
5. Analyze current trends in the gaming industry.

DESIGN PROCESS (PROJECT MANAGEMENT)

1. Create a development plan.
2. Describe the development process.
3. Explain iterations in the game process.
4. Create a development schedule.
5. Research development budgets and create a sample budget.

PERSPECTIVE, SCENE DESIGN, AND SCENARIOS

1. Create a game storyboard and timeline.
2. Develop characters (players and avatars, non-players).
3. Design the game world/environment.
4. Design gameplay (rules, directions).
5. Design user interactivity plan (keyboard, mouse, and controllers).

G. GAME DEVELOPMENT

COLLISION THEORY AND LOGIC

1. Use decision structures to detect collisions.
2. Use results of collision detection to produce intended reaction(s).
3. Use looping structures.

GAME GRAPHICS

1. Create game characters (players and avatars, non-players).
2. Create the game world/environment.
3. Create Splash, Credits, and Tutorial pages.

SOUND AND MUSIC

1. Select and edit appropriate music and sound effects.
2. Incorporate music and sound effects.

ARRAYS AND OBJECTS

1. Create objects.
2. Manipulate objects.
3. Use arrays to simplify coding on multiple instances of objects (enemies, stars, particles systems, ammo, snow/rain/sleet, etc.).

GAME CONTROL

1. Use Keyboard interactivity.
2. Use Mouse interactivity.
3. Use Controller interactivity.

ENVIRONMENTAL FORCES (PHYSICS)

1. Use Gravity to affect objects.
2. Use Velocity to affect objects.
3. Use Acceleration to affect objects.
4. Use Friction to affect objects.

TESTING AND DEBUGGING

1. Design plan for testing game for errors.
2. Design plan for usability testing.
3. Execute testing and usability plans.
4. Evaluate results of testing plans.
5. Fix errors generated by test execution.

H. CAREERS

1. Explain the various careers options available in the gaming industry.
2. Analyze the employment outlook within the industry.
3. Establish the relationship between the development team members when working on a design project.
4. Research the educational requirements of Game Design programs at various colleges.