Board/Authority Authorized Course Framework Template

School District/Independent School Authority Name: Kamloops/Thompson	School District/Independent School Authority Number (e.g. SD43, Authority #432): SD73
Developed by: Andres Ruberg	Date Developed: Dec. 22, 2017
School Name: Sa-Hali Secondary	Principal's Name: Sean Lamoureux
Superintendent Approval Date (for School Districts only):	Superintendent Signature (for School Districts only):
Board/Authority Approval Date:	Board/Authority Chair Signature:
Course Name: Digital Game Design 10	Grade Level of Course: 10
Number of Course Credits: 4	Number of Hours of Instruction: 100

Board/Authority Prerequisite(s):

None

Special Training, Facilities or Equipment Required:

Instructor should have Computer Science background, or experience in similar area. Facilities should include a Windows-based computer lab with computers purchased within the last 5 years each equipped with dedicated video cards. Additionally, 2D art generation software and 2D digital game-making software needs to be installed on all computers.

Course Synopsis:

This course is targeted at high school students who show interest in video game development as a learning vehicle for programming and digital art. The course gives students an introduction to the art and science of interactive video game creation. Students learn the fundamentals of digital artwork and animation, the computer science concepts required to create game software, and the mathematics necessary to add basic movement, collision, and physics behaviors to a simulation. By the end of the course students will have developed several, increasingly complex video game projects and will have a fundamental understanding of general programming principles.

Goals and Rationale:

Rationale:

British Columbia is rapidly attracting a concentration of video game production companies. Employment and compensation opportunities provided in this industry are among the fastest growing in Canada's knowledge-based economy. This program will provide our students with an opportunity to participate in curriculum that can be tied to nearly any future employment opportunity, while gaining an introduction to the field of video game creation and programming. Students will be encouraged to develop cross-curricular knowledge and skills in disciplines such as Mathematics, Science, and Art. Additionally, this course acts as a preview of the Tech Academy offered by SD73 which has established connections with a variety of post-secondary institutes that offer either scholarship opportunities or dual credit for Computer Science courses.

Goals:

- 2D digital art generation and simple 2D animation

- Programming principles common to every programming language

- Game design concepts that create enjoyable experiences

- Principals of art and animation that create a pleasing aesthetic

- Proficiency in using a modern game engine to create a video game

Aboriginal Worldviews and Perspectives:

The opportunities to explore aboriginal perspectives within Art and Game Design are significant. This is a heavily project-based course with numerous opportunities to explore topics of personal or societal interest. Students will be encouraged to both incorporate aboriginal artistic elements in their projects as well as to explore culturally relevant topics. Aboriginal speakers can be invited into the classroom to comment on the appropriateness of integrating their culture into a product such as a video game and the considerations students would want to take into account when developing projects inspired by aboriginal cultural elements.

Some of the First Peoples Principles of Learning closely tied to this course include:

- Learning is holistic, reflexive, reflective, experiential and relational

- Learning is embedded in memory, history and story

- Learning involves patience and time

- Learning requires exploration of one's identity

Course Name: _____   **Grade:** _____

BIG IDEAS

Game development is very different from game consumption and requires a distinct skillset.	Design involves understanding how others will interpret your creative work and adapting your product appropriately.	Programming is a fundamental aspect of video game development	Art skills can be practiced and learned and can result in ability improvement regardless of current proficiency.	Programming is a general skill with many concepts independent of programming language.

Learning Standards

Curricular Competencies	Content
Students are expected to do the following:	_Students are expected to know the following:_
Programming: • Declare, access and change variables • Analyze provided code and alter to suit the specialized needs of a project • Write small classes from scratch that implement essential behaviors desired in game assets **Design:** • Create and manipulate video game components within a game engine interface • Explore more advanced functionality of a game engine and demonstrate that functionality within a project • Visualize your expected outcome with a visual target • Write and regularly update a game design document outlining the elements of a project that provides direction and identifies key deliverables • Distinguish between desired features and essential features within a project that has an intended audience **Art:**	• class creation within the context of a programming language and that classes require both variables and functions • structure of flow control statements including conditionals and loops • fundamental art elements such as form, line, color, space, texture, value and shape • 12 principles of animation • the game loop (input, processing, output) • industry terminology (engine, minimum viable project, game object, sprite, model, visual target, game design document etc.) • simple commands and functionality of a 2D digital art

• Animate a character with multiple appendages • Develop a palette and aesthetic that reflects and builds upon atmosphere and theme • Demonstrate the effect of parallax and develop a multilayer parallax background • Create a tileset with tiles that wrap and connect seamlessly	program • simple commands and functionality of a 2D game engine

Big Ideas – Elaborations

None.

Curricular Competencies – Elaborations

None.

Content – Elaborations

None.

Recommended Instructional Components:

- Direct Instruction

- Demonstration

- Modeling

- Peer Teaching

- Experiential Learning

- Reflective Writing

- Project-based Learning

<u>One Working Model:</u>

Introduction to programming, digital art, game design, and game engine fundamentals: A series of lessons and mini-exercises that help students establish a basic set of skills that will enable them to be successful with the first project. Students will learn about the game loop and the basics of the 2D digital art and game design software. They will also be introduced to the art elements and the concept of a visual target. Students who acquire skills faster than the pace of the lessons can work ahead on advanced projects. Students who feel they are falling behind will have key exercises identified so that they can focus their efforts on the skills that are most important to ensuring future success.

Rube-Goldberg Project: This project explores the basic functionality of a game engine while giving students the opportunity to develop their digital art skills and explore the art elements. Students will be using simple game objects and the built in physics of the game engine to develop a Rube-Goldberg machine. Students will have great flexibility in how complex the machine is, the detail to which they develop their art, and the number of steps they implement.

Advanced lessons in programming, digital art, game design, and game engine functionality: A series of lessons and mini-exercises that help move students forward with their skills with a stronger emphasis on programming. Students will be introduced to flow control statements and the basic structure of a class. Students will be introduced to the 12 principles of animation. The structure of a game design document will be explored.

Top-Down Project: This project will be an opportunity for students to design and build a 2 dimensional top-down game. This project will give students the opportunity to learn and develop their programming, animation and game design skills, while exploring the game engine to a greater depth. Students will have the opportunity to focus on design, art or programming upon the completion of a game with basic functionality. For those that struggle significantly there will be a project with step-by-step instructions that walk the students through how to build a basic "Asteroids"-like game which they can then add to and modify.

Final set of structured lessons: A series of lessons that introduce a few more game engine elements including the concepts of parallax and tilesets. Additionally the students are shown a complex piece of code that enables them to create a platformer game. During this time numerous game design concepts are explored through mini-projects and videos from industry professionals.

Platformer Project: Students will develop a game design document and visual target before starting development of this platformer game. This game will be an opportunity for students to learn and develop the advanced concepts covered since the previous project.

Unstructured lesson time: Students will have the opportunity to work through tutorials that train them in skills of interest and that they would like to utilize for their final project.

Final Project: Students will develop a game design document and visual target before starting development of this game. This game will be an open-ended opportunity for students to create a game within the engine of their choice using whatever perspective fits their game best (including the option of 3D). During this project students choose which skills they are learning and developing and will have the option of teaming up with an additional student so that each can specialize in their field(s) of interest.

Recommended Assessment Components: Ensure alignment with the Principles of Quality Assessment

- Journaling
- Self-assessment
- Performance Assessment
- Skills-based Assessment
- Formative feedback
- Iterative Assessment

One Working Model:

Students will be given formative feedback during the instructional components of the course. This feedback is to help students understand their areas of strength and areas of challenge so that they can properly scope their projects and identify areas in which they may need to seek additional assistance and/or resources.

During projects key skills will be identified to students at the project outset along with levels of proficiency within each of those skills. Each level of proficiency will have descriptive statements of what a student needs to demonstrate in order to achieve that level. Students will be reminded of this document throughout a project so that they can plan accordingly. At the conclusion of the project students will be asked to self-assess themselves and indicate what proficiency level they believe they have achieved for each skill attached to that project. For each skill students will be asked to provide evidence for the indicated level. The student self-assessment will be considered alongside teacher observations and in the event of a discrepancy the student and teacher will engage in dialogue to ensure a fair outcome.

Skills can be re-assessed at any time a student has new evidence to present that supports of a higher level of achievement. Students are always welcome to ask how they might demonstrate a higher level of achievement and/or request mini-projects that will give them the opportunity to develop additional evidence of improved ability. Several skills will be attached to multiple projects. Only the highest level of achievement will be reported (there is no averaging).

The instructor should make clear what percentage is tied to each level of achievement and how those percents will be averaged. One model is to break each skill into a Basic, Advanced and Mastery levels and attach 60%, 80% and 100% to those levels of achievement (respectively).

Interims summarizing current student ability should be sent home 4 times per semester. All project assessment documents should be available for students and parents to view online at any point for reference.

Learning Resources:

The Zero Engine Workshop Website: https://zero.digipen.edu/Workshops/2016/index.html

DigiPen Technology Academy Manuals (Modules 1-5)

Extra Credits Game Design / Career Videos: https://www.youtube.com/user/ExtraCreditz/featured
Mark Brown Game Design Videos: https://www.youtube.com/channel/UCqJ-Xo29CKyLTjn6z2XwYAw

Additional Information:
None