SCHOOL DISTRICT NO. 73
(Kamloops - Thompson)

Board/Authority Authorized Course Framework Template

School District/Independent School Authority Name: School District No. 73 (Kamloops-Thompson)	**School District/Independent School Authority Number (e.g. SD43, Authority #432):** SD73
Developed by: Andres Ruberg	**Date Developed:** Jan. 7, 2018
School Name: Sa-Hali Secondary	**Principal's Name:** Rachael Sdoutz
Superintendent Approval Date (for School Districts only):	**Superintendent Signature (for School Districts only):**
Board/Authority Approval Date:	**Board/Authority Chair Signature:**
Course Name: SD73 Tech Academy 12A	**Grade Level of Course:** 12
Number of Course Credits: 4	**Number of Hours of Instruction:** 120

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 a digital projector and computers purchased within the last 5 years, each equipped with dedicated video cards. Additionally, 2D/3D art generation software (preferably Adobe Illustator and 3D Studio Max), a programming environment with a 2D game creation library (preferably IntelliJ and PyCharm), and 2D/3D digital game-making software (preferably Godot or Unity) need to be installed on all computers.

Course Synopsis:

This course is the first of four courses that make up the SD73 Tech Academy Program. This academy is a unique opportunity for students to gain experience working in a collaborative, inquiry-based environment where they develop the skills necessary to create video games. The abilities developed are a blend of generic skills that will serve them in almost any future opportunity (project management, collaborative problem-solving, time management, and creative expression) and industry-specific skills (computer science, programming, mathematics, physics, digital animation, game design, and user interface design). Students finishing the Academy will have a strong sense of whether or not they are interested in pursuing future opportunities in the digital arts or software development industries, and have an awareness of the opportunities that are available in these fields.

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 academy will provide our students with an opportunity to participate in curriculum that can be tied to nearly any future employment opportunity, while gaining skills specific to the fields of video game creation, digital animation and programming. Additionally, students will develop cross-curricular knowledge and skills in disciplines such as Mathematics, Science, and Art. Additionally, this academy connects students to post-secondary institutes that offer either scholarship opportunities or dual credit for Computer Science courses.

Goals:

- 2D and 3D digital art generation in addition to 3D and 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
- Time-management and project-management strategies
- Collaborative problem-solving
- Mathematics and Physics concepts utilized to create real-time interactive simulations (video games)

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 involves recognizing the consequences of one's actions
- 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 design is a complex process requiring thoughtful planning and time management	Mathematics and Physics underlie every modern game engine and animation program	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

Students are expected to do the following:	***Students are expected to know the following:***
<u>Programming:</u> • Create algorithms to solve problems using both plain English and pseudo-code • Declare, access and change variables • Solve problems using a wide range of operators (unary, binary and ternary) • Read and create code that makes use of conditional expressions • Implement code that can be made more efficient through use of loops (for and while) • Write small functions and classes from scratch that implement essential behaviors desired in game assets **<u>Design:</u>** • Extend an existing game, building upon existing mechanics • Give and receive feedback to create a more compelling product • Visualize your expected outcome with a visual target • Write and 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 **<u>Art:</u>** • Create digital 3D representations using a variety of 3D modeling skills • Generate basic 2D art assets necessary for game-making	• programming terminology (algorithm, variable, expression, operator, method/function, class, etc.) • class creation within the context of a programming language and that classes require both variables and functions • structure of functions and flow control statements including conditionals and loops • fundamental art elements such as form, line, color, space, texture, value and shape • 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 and 3D digital art programs • simple commands and functionality of a 2D game engine • components of a SMART goal • fundamental elements of “Agile” project management • trigonometric identities and Pythagorean theorem • vector terminology (direction, magnitude, normalization etc.)

Project Management: • Develop unique solutions to problems in a group context • Create a prototype for a game extension within a group • Reflect and iterate on a design **Mathematics & Physics:** • Solve simple problems involving trigonometry and Pythagorean theorem • Analyze and solve problems involving vectors • Illustrate diagrams for simple physics problems involving kinematics	• fundamental equations of kinematics

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

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 formal assessments and 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:

Python Arcade Documentation by Paul Craven: https://media.readthedocs.org/pdf/arcade-book/latest/arcade-book.pdf

DigiPen Technology Academy Manuals (Modules 1-5)

Guide to Writing SMART Goals: https://www.smartsheet.com/blog/essential-guide-writing-smart-goals

Guide to Agile Project Management: https://www.cio.com/article/3156998/agile-development/agile-project-management-a-beginners-guide.html

Khan Academy: https://www.khanacademy.org/

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

DigiPen Technology Academy Java Introductory Materials and Alpha Game Engine

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

Additional Information:

None