Board/Authority Authorized Course:
SD73 Tech Academy 12C

School District/Independent School Authority Name: School District No. 73 (Kamloops-Thompson)	School District Authority Number: SD73
Developed by: Andres Ruberg	Date Developed:
School Name: Sa-Hali Secondary School	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 12C	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 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, a programming environment with a 2D game creation library, and 2D/3D digital game-making software need to be installed on all computers.

Course Synopsis:

This course is the third 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.

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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

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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	How others perceive and interact with our products should shape how those products are developed and evolve over time	Digital media is a large industry with a wide variety career opportunities	Developing a complex project generally involves working with a team of individuals, each of whom have unique talents and personalities

Learning Standards

Curricular Competencies	Content
Students are expected to do the following:	**Students are expected to know the following:**
Programming: • Write your own artificial intelligence (AI) code • Develop deeper understanding of more complex concepts such as memory management and multi-dimensional arrays • Debug software through both standard techniques and systematic play-testing • Interact with industry professionals in this field and research post-secondary opportunities related to programming **Design:** • Develop a series of questions you would ask a client if you were being hired to develop a project that reflected their vision • Generate game concepts that make use of positive and negative feedback loops • Interact with industry professionals in this field and research post-secondary opportunities related to digital design **Art:** • Create a consistent thematic tile-map that can be used to generate a wide variety of environments • Develop an art concept based off of another individual's	• professional etiquette when interacting with a client • variety of time-management and project-management strategies • skills and experience required to enter industry-related fields • elements of a quality portfolio and/or application when applying for jobs or post-secondary opportunities • industry terminology (feedback loops, user experience (UX), user interface (UI), etc.) • pipeline for developing 2-dimensional artwork that is "tileable" • list of careers and post-secondary opportunities connected to area of interest

vision, simulating a client/freelancer arrangement
- Synthesize multiple background images to create the effect of 3D parallax within a 2-dimensional game environment
- Interact with industry professionals in this field and research post-secondary opportunities related to digital art

Project Management:
- Use "check-in" points in a project time-line to ensure that your product is on schedule, and adapt project objectives when behind schedule

Mathematics & Physics:
- Develop realistic simulations within games using knowledge of Physics and Math concepts
- Demonstrate knowledge of vectors through programming

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