Board/Authority Authorized Course Framework Template

School District/Independent School Authority Name: Okanagan Skaha	School District 67
Developed by: Nicolas Kast	Date Developed: October 25, 2018
School Name: Summerland Secondary	Principal's Name: Alan Stel
Superintendent Approval Date (for School Districts only):	Superintendent Signature (for School Districts only):
Board/Authority Approval Date:	Board/Authority Chair Signature:
Course Name: 3D Computer Animation 12	Grade Level of Course: 12
Number of Course Credits: 4	Number of Hours of Instruction: 120

Board/Authority Prerequisite(s):

Special Training, Facilities or Equipment Required:

Working computer lab, Maya 64bit software, Adobe Photoshop, Wacom tablet

Course Synopsis:

This course will focus one or more key elements of the animation pipeline. It is intended for students who have previously taken 3D Computer Animation 10 and 11. Students will focus their study in one or more of the following areas: Modelling, Texturing, Rigging, or Game Design. Students are expected to develop a personal learning plan detailing key areas of interest and knowledge inquiry at the start the course. They are

also required to create and maintain a digital journal detailing their experiences, learning plan progress and difficulties over the duration of the course.

Goals and Rationale:

Rationale:

This course will build on the essential 3D computer animation skills gained in the previous courses. The intent of this course is to allow students to further explore regions of personal interest and learning inquiry relating to 3D Computer Animation. It is intended for students planning to continue their animation ambitions at a post-secondary level. Students will use this course to explore key areas of the animation process in greater detail. Students are expected to work in an independent self-directed format developing their own personalized learning path. Their path of inquiry learning will focus on one or more of the following topics: Modelling, Texturing, Rigging or Game Design.

Goals:

Upon successful completion of this course, the student will have completed one or more of the following areas of personal interest in 3D Computer Animation:

Modelling

- Create and manipulate polygonal surfaces, NURBS surfaces, and Subdivision surfaces
- Apply various deformers manipulate meshes.
- Assess what mesh type to use when creating a model.
- Use hypershade workspace to apply shaders to 3D models.
- Analyze methods for unwrapping UVs and laying out efficient maps.

Texturing

- Layout UV Maps for texturing.
- Prepare images by painting and applying textures.
- Practice different techniques to apply texture detailing.
- Navigate the interface of an industry standard digital sculpting tool.
- Identify techniques for high level texture mapping.
- Generate textures using PhotoShop

- Construct surface materials and textures

- Apply photorealistic textures to images

- Apply custom shaders to photographic images

Rigging

- Create a basic character rig

- Create higher level controls for more advanced character needs

- Skin and bind mesh to the skeleton

- Create a fully functional rig for a humanoid or creature model

Game Design

- Design a game level concept

- Optimize 3D characters based on the game engine requirements

- Create animations for game characters

- Optimize textures based on game engine requirements

- Import 3D props and models into the engine and setup an environment

- Import 3D characters and animation into the engine

- Apply basic physics and dynamics to characters and props

- Finalize a working game level based on the initial concept

Aboriginal Worldviews and Perspectives:

- The ethics of cultural appropriation and plagiarism

- explore how First Nations used natural resources to produce tools, art, structures and cultural artifacts

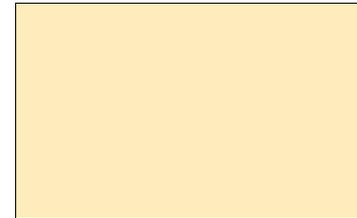- Respect for community elders as the knowledge holders

Course Name: _____   **Grade:** _____

BIG IDEAS

Personal animation skills require the evaluation and refinement of skills	Animation tasks are complex in nature and require a progression and breadth of skills	Complex tasks require different technologies and tools at different stages	Growth as an **animator** is dependent on perseverance, reflection and resilience	

Learning Standards

Curricular Competencies	Content
Students are expected to do the following:	*Students are expected to know the following:*
<u>Exploring and creating</u>	• Navigate the interface of a chosen industry standard 3D modeling software application.
• Demonstrate to ability to use **industry standard** software applications	• Use online support networks and help systems to expand software and Computer Animation knowledge base
• Explore personal areas of interest in in the Computer Animation Industry	• Model clean animate-able objects and environments
• Demonstrate create thinking by using ideas inspired by exploration	• Creating and preparing **textures** for 3D objects using industry standard image editing software.
• Develop skills and techniques used in **3D computer animation**	• Setup and prepare a basic **character rig** utilizing **inverse** and **forward kinematics** controls for animation.
• Demonstrate an active and disciplined approach to challenging and complex learning situations	• Optimizing 3d models, animations and **textures** for the purpose of integrating them into the game engine
• Expand on knowledge gained from previous courses	
<u>Ideating</u>	
• Take create risks in generating ideas and fulling project requirements	
• Screen ideas for possible conflicts and limitations	
• Maintaining an opening mind to allow rough concepts to develop and evolve into a finished product	

Modeling and Animating

- Identify appropriate tools, software, materials, knowledge, and **animation workflow pipeline** to complete assigned challenges
- Develop a project plan for student centered work when working individually or as a group to coordinate responsibilities and resources

Sharing

- Sharing of knowledge and skills while working in a collaborative environment
- Critically evaluating work to look for continual improvements to designs and knowledge
- Assess ability to work effectively both as individuals and collaboratively while implementing project management processes
- Communicating knowledge/progress in a digital journal format

Applied Technologies

- Informed awareness of existing, new and emerging, software and tools that assist in the in the creation process in 3D animation
- Analyze the role and impact of technology on culture and society
- Study the impact of e**-waste** and plastics on the environment
- Evaluate impacts, including unintended negative consequences, of choices made about technology use
- Analyze the role technologies play in societal change
- Examine how cultural beliefs, values, and ethical positions affect the development and use of technologies

- **animator -** an artist that produces multiple images and gives them the illusion of movement by displaying them in rapid sequence

Curricular Competencies – Elaborations

- **industry standard -** the generally accepted requirements followed by the members of an industry.

- **animation workflow pipeline** - the path by which an animation goes from an idea to a finished product. These steps include: story boarding, concept design, modeling, texturing, rigging, animating, lighting, rendering and editing.

- **3D computer animation-** the process of generating animated images with the use of 3D computer graphics and software.

- **e-waste –** discarded electrical or electronic devices that are destined for resale, salvage, recycling, or disposal.

Content – Elaborations

- **texture -** an image that is applied and accurately positioned on 3D model to change/modify the appearance of the model.

- **character rig -** a skeletal structure for a 3D model used to control its movement, deformation and bending.

- **inverse kinematics** - a control structure for certain types of joint chains used to control arms and legs, it lets you pose and animate an entire joint chain by moving a single manipulator.

- **forward kinematics** - used for creating simple arc motions, but tends to be tedious for animating a complex skeleton because each joint must be rotated individually to get your desired position, and the rotation must start with the root joint.

Content – Elaborations

Recommended Instructional Components:
- Direct instruction
- Demonstrations
- Tutorial support material
- Peer teaching
- Experimental learning and problem solving
- Digital journaling

Recommended Assessment Components: Ensure alignment with the Principles of Quality Assessment
- Performance assessment
- Self-assessment

Learning Resources:
- Lynda.com
- area.autodesk.com/all/tutorials/maya
- academy.autodesk.com/curriculum/animation

Additional Information: