

## Video Game Development

### Instructor:

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### Course Hours:

- Session 1: 8 a.m. – 10:30 a.m.
- Session 2: 11:30 a.m. – 2 p.m.

### Description:

Video Game Development explores the many facets of the video game development life-cycle: from asset creation (graphics & sound effects) to game design to coding.

- Design & develop 2D video games using support tools (e.g. [GameMaker Studio 2](#)).
- Produce 2D graphics using professional-level freeware (e.g. [Paint.net](#) & [GIMP](#)).
- Manipulate sound effects (SFX) using industry-standard tools (e.g. [Audacity](#)).
- 3D modeling & animation in a modern rendering engine (e.g. [Blender](#)).
- Learn programming concepts using a high-level programming language (e.g. C++).
- Explore core game design concepts.
- Utilize applied linear algebra for video games.

We pride ourselves on using professional-level freeware so that students can continue their game production at home without the need for expensive software. (Currently any exceptions are funded by the school during enrolment in the class.)

Leadership skills are developed through in-class game development team projects and suggested extra-curricular STEAM (Science, Technology, Engineering, Art and Math) activities. (That's just STEM plus Art).

### Instructional topics/units that will be covered (but not limited to):

- Game design – defining what the game will be.
- Game mathematics – calculating algorithms for the game.
- Game assets – providing art and sound assets for the game.
- Game programming – learning and using GML & C++ to define the game logic.
- Game development – individually and in teams, creating complete video games.
- 3D modeling – extensive work with creating still and animated 3D models.

### Key Learning Objectives and Industry Competencies

Upon successful completion of the program, students will be able to:

- Use industry-standard game design terminology and techniques.
- Use applied math to create 2D game engine algorithms.
- Discuss & create game-ready art and sound assets.
- Create, light, texture & animate rigged 3D models.
- Understand fundamental programming techniques applicable across a wide-range of computer programming languages.
- Program in a high-level language (e.g. C++): procedural & object-oriented paradigms.
- Script operable game engine components (e.g. in GML - GameMaker Language).
- Create game prototypes (e.g. using the [GameMaker Studio 2](#) game engine).

### Course Resources

- Game Engines: [GameMaker Studio 2](#)
- IDE: [C++](#) (although we've also been using a [online compiler](#)).
- Imaging: [Blender](#), [GIMP](#) & [Paint.net](#)
- Audio: [Audacity](#)

### Suggested Experience (prior to joining the course)

- Algebra 1.
- Computer (desktop or laptop) literacy: file system navigation, file & folder creation, use of common desktop applications.

### Suggested Materials

- Pen, pencil & eraser (and a sturdy surface when working from home).
- Paper: lined & graph.
- Geometry kit: ruler, compass & protractor.
- Headphones / earbuds.
- USB flash drive (when in-class); microphone & webcam (working from home).

## Professional Standards

Attendance is an important component to learning and employability. The Northwest Career & Technical Academy follows an attendance policy similar to business and industry in that a student is expected to be in full session attendance in order to ensure that maximum learning and productivity are achieved.

The standards reflect what all employers expect of their employees:

- **Being dependable:** students are to be at school every day.
- **Being on time:** students are expected to arrive to class on time.
- **Doing a full session's work:** students are expected to apply themselves.

When a student is absent, the absence should be excused (ideally, in advance) by a telephone call to the school office: (360) 848-0706, or via email.

As the computer game industry adopts a wide variety of dress codes and standards, students are expected to follow normal high school dress codes whilst leaning towards business casual.

## Credit Opportunities

- High school credits
  - 1.0 Computer Graphics
  - 1.0 Computer Programming
  - 1.0 Linear Algebra
  
  - Or, if attending for a second year (as a Video Game Development Designated Studies student): Computer Science (2 credits) & English (1 credit)
  
- Skagit Valley College credits [*year one only*]
  - A maximum of 24 credits are available (8 per college quarter), for students achieving a grade C or higher (if registered through high school) or D or higher (if registered through the college). These are awarded to college students per quarter and (if desired) to high school students at the end of 2<sup>nd</sup> semester.
  - Articulated courses and their credits:
    - MIT 105 – Video Game Development I (8 credits) – fall quarter
    - MIT 115 – Video Game Development II (8 credits) – winter quarter
    - MIT 205 – Video Game Development III (8 credits) – spring quarter

## Grades, Grading Scale, and Job Readiness

Whilst the grading system necessarily devolves into a numeric value (a percentage grade), students are graded using a standards-based philosophy which matches these descriptions:

**4. Excellent** (A equivalent)

Excellent work that demonstrates a clear and full understanding of the material, and a professional level of effort in completing all of the set tasks to a highly polished level. Going beyond what was asked. Capable of teaching the topic to others.

**3. Proficient** (B equivalent)

Very good work demonstrating clear understanding of the material. Perhaps there is a lack of a fuller effort, or some minor flaws in wider understanding or synergy. Doing exactly what was asked, but nothing more.

**2. Adequate** (C equivalent)

Good work demonstrating understanding of the building blocks that are required to complete a fuller solution. Perhaps some tasks are incomplete, or there is a demonstrable lack of effort, or there are some key flaws in the understanding.

**1. Limited** (D equivalent)

Satisfactory work demonstrating some understanding of at least the basic principles being taught. Many tasks may remain incomplete, or there may be a marked lack of effort in completing the work, or several key flaws in the understanding. Only some of the building blocks required to demonstrate the standard are understood.

**0. Incomplete** (F equivalent or NC – No Credit)

Indicates either a failure to attempt the work (perhaps due to absence) or a demonstrable failure to understand or replicate the basic principles being taught. The simplest of the given tasks remains incomplete or the attempt indicates a clear lack of understanding, engagement or effort.

## Marking

Assessment materials are marked up with the following feedback symbols:

✓	This section is correct.
✓✓	Everything on this page is correct.
✗	This answer is incorrect.
(✗)	This answer is nearly correct but has a noticeable flaw.
...	This answer is missing something but it's nearly there.
O	A circled answer (or part of an answer) is incorrect.
<del>answer</del>	A struck through part of a longer answer is irrelevant.

### Late Work Policy

Late work may be accepted, but is expected to be completed as homework. Class tests may be carried out late but at the discretion and best judgement of the instructor so as not to allow unfair advantage. For extended periods of absence, a personal success plan will be discussed that can measure the students ability against a streamlined set of core competencies.

### Re-Do Policy

Grades may be re-evaluated where a student clearly demonstrates completion of previously ungraded work, or completion of clearly superior work. Where a time constraint (such as a district deadline for submission of grades, or the limited time available to any instructor) comes into play, there is a limit to how much re-do work can be evaluated. Additionally, some tests cannot fairly be re-run (e.g. a multiple choice test that has been reviewed with the class).

### Extra Help

This syllabus outlines the free software resources that students can install on their (Windows or Mac) home computers.

### Professional and Industry Behavior Expectations

All students at the Academy will be responsible for the rules and expectations laid out in the Student/Employee handbook. The handbook can be downloaded from the website at: <http://www.nwtech.k12.wa.us/> (under Students & Parents).

In addition to the overall Academy expectations, in the computer lab the following is expected:

- No drink or food in the lab.
- No use of mobile devices (e.g. mobile phones) or music players.
- Professional computer use is for work-related activities only.

### Next Step

After successful completion of the Video Game Development course, students have some great opportunities to continue their education, having experienced a broad range of skills encompassed within the broader scope of game development.

Students will know whether programming in general is for them, or game programming in particular. At the same time, they'll have gained valuable insights into 2D and 3D computer graphics, game design and software development.