

## Program DigiPen Video Game Programming AP

Instructor Name	Thomas Foster	Phone	360-570-4447
Room #	B9	E-mail	thomas.foster@tumwater.k12.wa.us
Office Hours	7:00 a.m. – 7:30 a.m. 2:00 p.m. – 2:30 p.m.	Web Page	<a href="https://www.tumwater.k12.wa.us/Domain/1761">https://www.tumwater.k12.wa.us/Domain/1761</a>

### Course Overview:

The (DVGPA) program is an advanced program in “creating makers of technology”. This course will teach the basics of computer programming, video game development, and demystify the inner workings of a computer. Students will first be introduced to building video games using a block style environment. Then we will introduce the C programming language to serve as a programming foundation. Unity is currently serving as our primary game engine. In the Unity development environment, students will use C# as their scripting language as they develop their game projects.

Students will get a basic understanding of binary and other number systems a computer uses. There will be sections on both basic, electrical circuits and logic circuits. They will also use their programming and computer knowledge to make games in a pre-existing game engine, first on their own and then in a game team that will include artists from the art class.

- Make video games using C, C#, and 2D/3D computer animation
- Partner of DigiPen Institute of Technology
- 1.0 3rd year math credit
- 1.0 fine art credit
- Sit for CS A Advanced Placement® exam if you choose

### College Credit

DigiPen Computer Science is articulated with several entry-level college classes at the DigiPen Institute of Technology in Redmond, WA. Students will also be prepared to take the College Board AP computer science exam.

### Course Objectives and Units:

- A familiarity with and understanding of mathematical concepts most commonly used by game developers.
- The ability to implement simple physics, collisions, graphics, and AI for a 2D game.
- An understanding of how object-oriented programming makes large scale programs more manageable.
- The skills necessary to work on a complex programming project with multiple people.

### CS100 -

#### Number Systems

Students will learn about number systems with different radix values, such as binary, octal, and hexadecimal. They will learn to convert between different systems.

Representation of Numbers in Computation	Students will learn how different number types are stored in computer memory. They will be able to identify, convert and understand the limitations and applications of: Unsigned, 2's complement, and IEEE-754 32-bit floating point.
Basic Electricity and Electrical Circuits	Students will understand some of the basics of electric circuits including voltage current and resistance (Ohm's Law). Students will learn how electrons flow in the reverse of the current's direction, and how magnetic fields encircle current flow.
Digital Circuits and Logic Gates	Students will be able to read circuit diagrams and make truth tables for IF/NOT, AND/NAND/OR/NOR/XOR. Students will be able to create, read, and build from relays (R/S Flip-flops, D/L Flip-flops, Half-adders). Students will understand the use of and identify power, ground and data busses.
Operational Code	Students will be able to use code to do basic calculations, conditional branching, indirect memory addressing, and understand representation of fundamental data types.

### CS120 -

C Syntax and Style	Students will learn how to create C programs using the proper programming syntax and read errors. In addition they will learn how to write code cleanly and use comments to both make headers and explain their code.
Console Input/Output	Students will be able to both send information to the console from their programs, and receive information in their programs from a user. This includes the ability to format information precisely.
Expressions	Students will be able to read, use, and understand expressions in code. This includes understanding precedence and how to use a precedence chart.
Conditionals	Students will become proficient in using if, else, and switch statements in C. They will learn how these statements are the basis of the computer making choices.
Iteration	Students will learn how to use while, do while, and for loops. They will learn the importance of iteration in algorithms.
Functions	Students will learn how to create their own functions, and why functions are a useful tool to prevent the need to repeat code manually.
Arrays	Students will learn about arrays, and how to properly and safely use them. They will understand how arrays are stored in memory. They will learn how to use arrays in conjunction with iteration to solve many problems.
Pointers	Students will learn how pointers are used to reference other variables. They will learn why pointers are important to use data outside of its normal scope.

Strings	Students will learn about how to use null terminated C style strings. Students will learn the similarities and differences between strings and arrays.
Structures	Students will learn how to program their own structures, and how structures are stored in memory. They will learn about some similarities and differences with structures and arrays.
File Input and Output	Students will learn how to save information to files and read saved information from a file saved to the hard drive.
Dynamic Memory Allocation	Students will learn how to use malloc and similar functions to allocate memory for a program at runtime.

## **GAM100 -**

Game Production	Students will learn all that goes into the production of a modern video game. This includes pitches, design documents, scheduling, milestones, testing, time management, and working on interdisciplinary teams.
Game Programming	Students will learn how to program games using a largely already existing game engine.
Game Design	Students will learn how to design fun and interesting games given a limited amount of time.
Presentation Skills	Students will learn how to present their projects
Game Analysis	Students will be able to classify games better, as well as dissect a game down to it's mechanics.
Issues and History of Gaming	Students will learn about different issues in the game industry including marketing, target audiences, age/gender issues, game ratings systems, copyright law, and ethics. Students will also learn about how many games came into existence, and how the game industry has grown over the years.

## **Industry Certification/Employment Outlook:**

With guidance from the program partner, DigiPen Institute of Technology, the course prepares students for skills necessary for video game industry's biggest need: qualified video game programmers and artists. Many of DigiPen's college graduates have secured positions with top companies such as Nintendo, Interplay, DreamWorks Interactive, KnowWonder, 343 Industries, and Valve.

## **Course Supplies & Fees:**

### **Recommended-**

- Notebook - one with easy to remove pages is preferable; can be replaced a program like google docs
- Writing Utensils including at least one pencil
- A Windows computer at home capable of running the Unity Engine found at Unity.com
- Flash drive or portable hard drive.

- *C Programming - A modern Approach, Second Edition*, by K.N. King, Published by W.W. Norton & Company April 2008. ISBN-10: 0-393-97950-4
- *The Hidden Language of Computer Hardware and Software*, by Charles Petzold, Published by Microsoft Press, ISBN-10: 0-7356-1131-9
- *Game Design: Principles, Practice, and Techniques - The Ultimate Guide for the Aspiring Game Designer*, by Jim Thompson, Barnaby Berbank-Green, and Nic Cusworth, Published by Wiley, ISBN-10: 0-4719-6894-3

### Grade Scale:

Percent	Letter Grade	Percent	Letter Grade
100-94	A	79-77	C+
93-90	A-	76-73	C
89-87	B+	72-70	C-
86-83	B	69-67	D+
82-80	B-	66-59	D
69 and below = F			

### Redo Policy

Anything that is turned in **on time** that is considered a good faith effort by the teacher (and documented as such) will have up to two weeks to be resubmitted and re-graded with no penalty.

Good faith effort is defined as: the student's work demonstrates an attempt to fully complete the assignment. If the teacher believes the student merely submitted an assignment "just to turn something in" with the plan to resubmit the assignment later, the student has not demonstrated good faith effort. The aim of the resubmission policy is to grant students the opportunity to fully grasp the concepts and prove a topic's mastery.

### Homework Policy

All assignments will have their due date given when they are assigned. It is possible to receive an extension, but only if you have a valid reason and discuss it with the instructor **BEFORE** the assignment is due. Late assignments receive a 10% penalty, and any assignment over 2 weeks late is automatically a 0%.

A good faith effort, turned in on time, can be *resubmitted* with no penalty as long as it is within 2 weeks of the assignment due date. You should always try to submit an assignment by the due date, even if it is not complete!

### Food & Drink

There is to be no food allowed at computer workstations. Drink is allowed if it is in a re-sealable container.

# Additional Policies and Course Requirements

## NMSC Expectations & Policies – Student Handbook

Students are expected to review and follow the school rules, procedures, and processes outlined in the NMSC Student Employability Handbook. New Market Skills Center follows Tumwater School District board policies. Rules will not be reprinted in the syllabi

### Cheating/Plagiarism

Students are expected to do their own work. Cheating and Plagiarism (presenting another writer's work as one's own) will not be tolerated.

### Electronic Equipment

Personal electronic devices, including but not limited to, cell phones, iPods, PSP's, mp3 players, cd players can be a disruption to the educational process and are not permitted at school

*Students violating the electronics policy can expect:*

- 1<sup>st</sup> offense – warning
- 2<sup>nd</sup> offense – confiscation of equipment

**Dress Code/Uniform Requirement are described in the NMSC Student**

### Handbook Safety Policy

Students are to follow standard safety practices in the lab at all times.

### Please sign and return to instructor

I have read, understand, and agree to the class rules, grading and expectations outlined in this syllabi.

_____	_____	_____
Student Name (Printed)	Student Signature	Date
_____	_____	
Parent/Guardian Signature	Date	

Communication between parents and staff is extremely important for student success. Please complete the information below and indicate which type of contact you prefer.

Parent Cell # \_\_\_\_\_

Student Cell# \_\_\_\_\_

Parent Email \_\_\_\_\_

Student Email \_\_\_\_\_