

## **PROGRAM BENEFITS**

- BC is recognized as an international digital entertainment centre for console and mobile game production, and app design. As a result, video game production companies, including EA Sports, Capcom, Black Tusk Studios, Relic Entertainment, United Front Games have strategically chosen locations in Metro Vancouver and employment opportunities in this industry are expanding.
- DigiPen courses provide students with an opportunity to participate in the curriculum of a recognized video game university (DigiPen) while gaining valuable experience in hands on game creation.
- Cross Curricular connections will include Math, Geometry, Physics, Computer Science and the Arts.
- Earn elective credits in grades 10, 11 and 12.

## **COURSE SEQUENCE**

### **GRADE 8 (2 BLOCKS)**

#### **Junior Programming Level 1**

This class teaches the fundamentals of programming and how following good practices results in solid code. Topics covered will include variables, conditional statements, looping and iteration, and arrays. Students use their knowledge of these core concepts to create a series of simple computer games.

#### **Students will learn:**

- Fundamental programming concepts
- Algebraic expressions and mathematical operators
- Programming for games

#### **Junior Programming Level 2**

Expanding on the knowledge and skills learned in Junior Programming Level 1, students will study more advanced programming concepts — allowing them to create more exciting and robust projects. Topics covered include functions, strings, and graphical programming. This workshop includes larger projects that incorporate concepts from both Junior Programming Level 1 and Level 2.

#### **Students will learn:**

- Intermediate programming techniques
- Graphics principles and Cartesian mathematical concepts
- Design and execution of larger programming projects

## **GRADE 9 (2 BLOCKS)**

### **Video Game Development Level 1**

This class examines basic programming techniques, but also looks at the other disciplines needed to create a game, including game design, art production, and sound design. You will gain not only a new appreciation for the hard work that went into making your favorite games, but also the tools to start bringing your own game ideas to life.

#### **Students will learn:**

- The video game production process, including writing design documents, game testing, and problem solving
- Game design principles, including game balance and effective interface design
- Coding basics such as variables, conditionals, iterations, and functions
- Art production processes and tools

## **GRADES 10 - 12**

### **Game Programming Level 1: 2D Video Games**

This class launches students into the world of computer programming through the practice of writing code for video games. The emphasis in this workshop is on learning the foundational programming concepts — including variables, conditional statements, and loops — that form the basis of games and other programs. Students are also introduced to concepts in physics, graphics, and audio libraries while programming the logic for a series of PC games.

#### **Students will learn:**

- Java coding basics such as variables, conditionals, iterations, and functions
- Basic video game programming concepts, including character animation, character behaviors, sound effects, music, and processing user input
- Game development math concepts such as 2D coordinate systems, vectors, linear equations, and quadratics
- Physics topics such as gravity, friction, opposing forces, and momentum

### **Game Programming Level 2: 2D Game Engine**

Building on the Java programming skills gained in Level 1 of this series, students will focus on understanding the crucial computer science, computer graphics, and mathematical concepts of how 2D game engines are created. This challenging course pushes students beyond being simply a user of technology and puts them on the path toward creating it.

#### **Students will learn:**

- Object-oriented programming concepts such as classes, inheritance, composition, and encapsulation
- Programming skills to detect and code character interactions and form connections between objects
- Implementation of algebra and trigonometry in game development

## **Mobile App Development**

Mobile devices like phones and tablets have created countless new possibilities for skilled software developers. This class teaches you how to program mobile apps while building on the programming concepts learned in the prerequisite course. Students will create a variety of applications for a tablet computer to see just how developers take advantage of these powerful new devices.

### **Students will learn:**

- User experience, interface design, and programming using Java
- Math concepts like variables, number systems, and coordinate systems
- Unique mobile app development challenges, including the distribution process and channels for mobile apps

## **GRADES 10 - 12**

### **CYBERSECURITY AND ENCRYPTION**

This hands-on class explores different ways students can protect their online security, as well as how networked computers communicate with one another and how systems can become compromised. Students will learn about data encryption techniques and career opportunities in cyber security.

### **Students will learn:**

- Network vulnerabilities and strategies to protect one's online identity
- The math and programming of encryption
- Online safety practices and ethics

### **FURTHER OPPORTUNITIES**

The District will be connecting with relevant partner groups to facilitate the possibilities of:

- Advanced credit in Computing Science Departments of local colleges/universities or at the DigiPen Redmond or Singapore campuses.
- Workplace practicums with local game development companies.

*Based out of Redmond, Washington, the DigiPen Institute of Technology offers a variety of programs in Computer Science, Animation, Video Game Development, and Game Design.*