Murrieta Valley Unified School District
High School Course Outline
June 2011

Department: Business and Technology

Course Title: Visual Basic Programming
(AKA Video Gaming II--Computer Programming)

Course Number: 7555

Grade Level: 11- 12

Length of Course: Year

Prerequisite: Video Gaming I

Course Description:
This course develops and refines the programming and video gaming skills learning in Video Gaming I. Creating 2-D and 3-D video gaming worlds through structured programming, students will continue to use BASIC programming, Alice 2.0, and its derivatives. Students are led through the exciting world of video game design with text, pictures, animations, and digital video. The journey to design and develop programs will be done with real life skills through analyzing, brainstorming, and creating solutions using the design process. The capstone for this course will be submitting a learning game to a national game design competition.

I. CTE Standards

Foundation Standards

1.0 Academics

Students understand the academic content required for entry into postsecondary education and employment in the Arts, Media, and Entertainment sector.

1.1 Mathematics

(2.2)Apply strategies and results from simpler problems to more complex problems.
(2.3) Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques.
(2.4) Make and test conjectures by using both inductive and deductive reasoning.
(2.5) Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
(2.6) Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.

(2.8) Make precise calculations and check the validity of the results from the context of the problem.
(3.1)Evaluate the reasonableness of the solution in the context of the original situation.
(3.2)Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems.
(3.3) Develop generalizations of the results obtained and the strategies used and apply them to new problem situations.

2.0 Communications:

Students understand the principles of effective oral, written, and multimedia communication in a variety of formats and contexts.

2.2 Writing

(2.4) Write persuasive compositions:
a. Structure ideas and arguments in a sustained and logical fashion.
b. Address readers' concerns, counterclaims, biases, and expectations.

2.4 Listening and Speaking

(1.7) Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.
(2.4) Deliver multimedia presentations:

a) Combine text, images, and sound and draw information from many sources (e.g., television broadcasts, videos, films, newspapers, magazines, CD-ROMs, the Internet, electronic media-generated images).
b) Select an appropriate medium for each element of the presentation.

(2.5) Understands written business communication modes, such as memos, e-mail messages, and one-page executive summaries.

4.0 Technology

4.1 Understand past, present, and future technological advances as they relate to a chosen pathway.
4.2 Understand the use of technological resources to gain access to, manipulate, and produce information, products, and services.
4.4 Understand effective technologies used in Web site development and the Internet.
4.5 Know procedures for maintaining secure information, preventing loss, and reducing risk

5.0 Problem Solving and Critical Thinking

5.1 Apply appropriate problem-solving strategies and critical thinking skills to work-related issues and tasks.
5.2 Understand the systematic problem-solving models that incorporate input, process, 6outcome, and feedback components.
5.3 Use critical thinking skills to make informed decisions and solve problems.

8.0 Ethics and Legal Responsibilities

8.3 Understand the role of personal integrity and ethical behavior in the workplace.

8.5 Know how to design systems and applications to allow access to all

9.0 Leadership and Teamwork

9.3 Understand how to organize and structure work individually and in teams for effective performance and the attainment of goals.

10.0 Technical Knowledge and Skills

10.1 Know how to use a variety of business- and industry-standard software and hardware, including major proprietary and open standards.

10.7 Analyze the functions, features, and limitations of different operating systems, environments, applications, and utilities.

Pathway Standards

A. Information Support and Services Pathway

A1.0 Students understand the potential impact of information systems in different organizations:

A1.1 Evaluate the systems-development life cycle and develop appropriate plans to maintain a given system after assessing its impact on resources.

A1.2 Evaluate support needs for different data and systems configurations.

A2.0 Students understand the process of systems implementation:

A2.2 Understand the criteria and processes for evaluating the functions of information systems.

A2.3 Know the processes needed to install and maintain systems.

A3.0 Students understand important aspects of project management:

A.3 Understand the necessity of and procedures

A3.3 Know the functions of various tools used to manage projects involving the development of information systems.

A7.0 Students understand software applications and life-cycle phases:

A7.2 Evaluate the effectiveness of software to solve specific problems.

A7.3 Know a variety of sources for reference materials (e.g., online help, vendors' Web sites, online discussion groups, tutorials, manuals).

A7.4 Diagnose and solve software application problems.

A7.5 Know current and emerging industry-standard technology and trends.

A10.0 Students understand and implement database management systems:

A10.3 Understand the various structures appropriate for specific applications within database management systems.

B. Media Support and Services Pathway

B1.0 Students understand the effective use of tools for media production, development, and project management:
B1.4 Analyze media and develop strategies that target the specific needs and desires of the audience.

B3.0 Students understand the use of different types of peripherals and hardware appropriate to media and technology:
B3.4 Understand the types of media storage and the use of appropriate file formats, and know how to convert data between media and file formats

B5.0 Students understand and apply knowledge of effective Web page design and management:
B5.10 Differentiate among various versions of Internet programming languages.

D. Programming and Systems Development Pathway

D1.0 Students understand the strategies necessary to define and analyze systems and software requirements:
D1.1 Develop information technology-based strategies and project plans to solve specific problems.
D1.2 Know how systems and software requirements are determined in various situations.
D1.3 Know the effective use of tools for software development.
D1.4 Know the software development process.

D2.0 Students understand programming languages:
D2.1 Know the fundamentals of programming languages and concepts.
D2.2 Compare programs by using control structures, procedures, functions, parameters, variables, error recovery, and recursion.
D2.3 Understand digital logic, machine-level representation of data, memory-system organization, and use of assembly-level programming architecture.

D3.0 Students understand the creation and design of a software program:
D3.1 Analyze customers' needs and requirements for software.
D3.2 Know how specifications and codes are developed for new and existing software applications.
D3.3 Understand the abstract organization of information and how programs maintain the properties of the data structure while they perform such operations as search, insert, or load-balancing.
D3.4 Know multiple ways in which to store, retrieve, and access information.
D3.5 Understand how to track software versions.

D4.0 Students understand the process of testing, debugging, and maintaining programs to meet specifications:
D4.1 Know the steps involved in the software-testing process. D4.2 Know the methodologies of program maintenance to preserve intended program applications and the operation of scheduled batch jobs and real-time jobs.
D4.3 Know how different systems and associated utilities perform such functions as file management, backup and recovery, and execution of programs.
D4.4 Understand the differences between simple and multiuser operating systems.

D6.0 Students understand the importance of effective interfaces in the interaction between humans and computer systems:
D6.2 Use knowledge of cognitive, physical, and social interactions to create and design user-friendly computer practices and applications that meet the needs of the market.

II. Goals

The student will:

A. Describe how a career utilizes information technology and the skills and education the career requires

B. Develop a timeline describing the development of hardware and software, networking and the Internet. Using the past, the student will make predictions about the future of information processing.

C. Effectively use logical sequencing to solve problems with completion a basic structure chart for a given procedure. Proficient skills learned are to complete flow chart for a given problem.

D. Learn to write and express ideas on a storyboard to create video game.

E. Use multiple numbering systems:
   1. Completing arithmetic operations in binary and describe the difference between octal and hex numbering systems.
   2. Completing arithmetic operations in text and select the appropriate number systems for doing applications.

F. Incorporate algorithms into programs to solve problems by writing and developing algorithms which utilize variables to accomplish tasks.

G. Effectively apply the structured programming process to real type-problem solving:
   1. Given support, the student will design and implement an algorithmic solution consistent with the structure and flow chart.
   2. Given a design outcome, the student will independently design and use basic programming skills process to achieve a desired outcome.

H. Understand the concept of object collision and be able to write programming code that will manipulate object collision within the game engine.

I. Write simple/complex commands in Basic Computer Language for creating a random number, printing a name to the screen, performing a task repeatedly (for/next loop).

J. Describe and be able to manipulate a DO LOOP in basic programming language.

K. Be able create and apply array visualization structure and movement.

L. Effectively utilize the power of operative systems in networking.
   1. Utilizing an operating system/network for navigation and file management
   2. Using an operating system/network the student will establish and maintain a file system.

III. Outline of Content for Major Areas of Study:

A. Gaming Industry
   1. History
   2. New technology
   3. Game hardware

B. Introduction 3D and the gaming rules of gaming
   1. 2D & 3D overview
   2. Aspects of well balanced games
   3. Basic Software-Engineering Principles
   4. Design Concepts
   5. Character Development
   6. Storyboarding
   7. Game Levels
   8. Graphics and Sound
   9. Aspects of well balanced games

C. Alice 2.o programming basic/intermediate topics:
   1. Programming preparation and documentation procedures
   2 Game story/Storyboards/Characters
   3. Application of Logical Systems
   4. Simple commands and structures
   5. Basic Programming
   6. Object Oriented and Event Driven Programming:
   7. Methods and Parameters
   8. Interactive programming –
   9. Looping-Branching
   10. Flowcharts
   11. Algorithms
   12. Boolean Logic
   13. Event and object handling methods
   14. Using Functions and Control Functions
   15. Functions and what if/else and Boolean Functions
   16. Repetition: Definite and conditional Loops
   17. Repetition: Recursion
   18. List and Listing Processing
   19. Variables and Revisiting Inheritance
   20. Platforms

D. LEVEL I GAME DESIGN
1. A simple shooting game
2. Loading models
3. Assigning controls
4. Shooting
5. Adding displays and limitations
6. Adding a target and scoring

E. LEVEL II GAME DESIGN
1. Adding objects to the game
2. A simple user interface - Cockpit instruments
3. Making and assembling coaster track elements
4. Game logic
5. Real world physics in a game
6. Creating weapons effects for a first-person shooter

F. LEVEL III GAME DESIGN
1. Game Character animation using armatures
2. Preparing a mesh
3. Working with bones
4. Creating a hierarchy and setting rest positions
    a. Naming and parenting bones
    b. Basic layout
    c. Coordinate system conventions
5. Establishing mesh deformation vertex groups
6. Weight editing
7. Animation
    a. Multiple actions
    b. Creating an idle cycle
    c. Creating a walk cycle
    d. Game logic
8. Creating a memory game
9. Customizing an image puzzle

G. Working with Blender

1. Navigation in 3D Space
   a. 3D View
   b. 3D View Options
   c. 3D View Usage
   d. Camera View
   e. Layers
   f. Local or Global View

2. Sketch in 3D Space
   a. Introduction to Grease Pencil
   b. Drawing sketches
   c. Layers and Animation
   d. Converting sketches to geometry

3. Manipulation in 3D Space
   a. Basics
   b. Manipulators
   c. Gestures
   d. Axis Locking
   e. Pivot Points
   f. Transform Orientations
   g. Advanced Transformations
   h. Snap to Mesh
   i. Proportional Edit
   j. Transform Properties

H. EMPLOYMENT UNIT AND PORTFOLIO DEVELOPMENT

A. Identify available positions in the industry through the use of the Internet

B. Complete an application form correctly

C. Participate in a simulated employment interview

D. Describe portfolio formats

E. Create a web-based portfolio

F. Create a CD Rom-based portfolio.

G. Create a personal video of a product and the CEO of a company

H. Follow portfolio guidelines and elements

I. Prepare a cover letter and resume

J. Identify ways to market yourself

IV. Accountability Determinants

A. Key Assignments
1. Understand and demonstrate how to use a 3D game engine
2. Explain the basic elements of a well-designed video game program
3. Review and analyze written game design material
4. Participate in class discussions
5. Evaluate Game Engines and the game types
6. Effectively communicate game design information to peers
7. Program design and implementation of storyboards and scenarios
8. Implement/import students own characters and scenery designs programmed into Alice 2.0 Program.
9. Create and import designs from Blender in Alice 2.0.
10. Prepare and create oral presentation for a company to present final video game product.
11. Present your games to peers

B. Assessment Methods
1. Teacher observations of day-to-day classroom participation, effort, behavior and achievement
2. Individual performance tests, internship log, software activities and daily work assignment
3. Student will produce and create actual video games and people model
4. Create Student Portfolio
5. Teacher observations of day-to-day classroom participation, effort, behavior and achievement

V. Instructional Materials

A. Required Text and Software
1. Blender

2. Flash CS5
3. Alice2.0/2.2 software
4. Microsoft Office 2007/2010
5. ISBN : 1-4188-5934-6
   Alice 2.0 Introductory Concept and Techniques – Shelly Cashman Series
6. ISBN: 0-13-187289-3 *Learning to Program with Alice.*
7. Video Game Design Level 2 software- Isupportlearning!
8. Game Development Essentials
9. Blender Gamekit, 2nd edition book
10. Exploring: A designers Guide to Art of Interactivity - Adobe Flash CS5 book

B. Supplementary Materials
   1. Video Game Controller
   2. Headphones
   3. Other *Software Utilized:*
      Adobe Photoshop/Illustrator
      Macromedia Flash/Fireworks