Murrieta Valley Unified School District **Board Submission: June 2015**
HIGH SCHOOL COURSE OUTLINE

Course Title: C# Advanced Game Design and Development

Department: Business/Computers/Technology

Course #: 7557

Grade Level/s: 11-12

Length of Course: Year

Prerequisite/s: Computer Programming and Game Design and
Game Design and Development

UC/CSU (A-G) Req: (G) College Prep Elective

Brief Course Description: This course develops and refines computer programming skills. Students are introduced to C# programming and game development with XNA Game Studio. This course emphasizes object-oriented programming methodology with a concentration on problem solving and algorithm development. This course also includes the study of data structures. Students will gain a basic understanding of the core concepts in computer programming, such as: types and variables, methods, conditional statements, loops and collections, and exceptions handling. In addition, the course will focus on programming skills, but also on each discipline related to STEM (science, technology, engineering and math). Applying knowledge, concepts and skills of game design and development, students will be introduced to a wide range of programming languages, concepts and technical skills. Advanced Game Design and Development is a capstone course within the pathway of Information and Communication Technology.

I. GOALS

The students will:

A. Acquire a wide range of concepts and technical skills in six separate areas greatly helping with future student success

B. Acquire game development skills by programming with Visual Studio, XNA Game Studio and Kinect/Arduino programming

C. Exhibit creative, innovative and critical thinking skills to enhance existing game programs

D. Enhance communication and collaboration skills

E. Utilize appropriate and accessible digital tools for assignments, projects and research

F. Apply appropriate engineering, physics and mathematical concepts critical to game development

Course Title: Advanced Game Design and Development

II. OUTLINE OF CONTENT FOR MAJOR AREAS OF STUDY

A. Microsoft Visual Basic Software Game-it Advanced Program - Visual Studio / Visual C# Express and C#
Software and Systems Development Pathway Anchor(C1.1,C1.2,C1.4,C3.3, C4.4,C4.5,C4.9,C5.0,C6.0)
Games and Simulation Pathway Anchors (D7.1, D7.4, D7.5)
1. Types and variables
2. Methods
3. Conditional statements
4. Loops and collections
5. Exception handling and other concepts
6. Object-oriented programming

B. XNA Game Development Programming
Software and Systems Development Pathway Anchor(C1.1,C1.4,C4.4,C4.5,C4.9,C5.0,C6.0)
Games and Simulation Pathway Anchors (D1.2,D1.5,D1.9,D2.1,D2.3,D2.4,D2.7, D3.4,D.5.0ALL, D6.0 ALLD7.1, D7.4, D7.5)
1. Bouncing Ball game
2. RPG game

C. Kinect Programming /Arduino Programming
Software and Systems Development Pathway Anchor (C1.0 ALL C3.0 ALL4.4,C4.5,C4.9,C5.0,C6.0)
Games and Simulation Pathway Anchors (D1.2,D1.5,D1.9,D2.1,D2.3,D2.4,D2.7, D3.4,D.5.0ALL, D6.0 ALLD7.1, D7.4, D7.5)
1. Working with depth information from a 3D camera
2. Analyzing and manipulating point clouds
3. Tracking the movement of people's joints
4. Background removal and scene analysis
5. Pose and gesture
6. Kinect Processing,
7. Arduino with 3D scanning
8. Building meshes
9. Preparing 3D models for fabrication
10. Defining and detecting gestures
11. Displaying and manipulating 3D models
12. Designing custom input devices with limited ranges
13. Forward and inverse kinematics

D. Job Skill of Interviewing and Job Shadowing
Games and Simulation Pathway Anchors (D1.3,D1.5,D1.8, D1.9)
1. Game design and development
2. Technological field of programming
3. Other technology related jobs

III. ACCOUNTABILITY DETERMINANTS

A. Key Assignments
1. Students will complete programming projects based on information and needs gathered from staff of various clubs and organizations. Students will identify the technology and software needed for the programming project
Software and Systems Development Pathway Anchor(C1.1,C1.4,C4.4,C4.5,C4.9,C5.0,C6.0)
Games and Simulation Pathway Anchors (D1.2,D1.5,D1.9,D2.1,D2.3,D2.4,D2.7, D3.4,D.5.0ALL, D6.0 ALLD7.1, D7.4, D7.5)

2. Students will complete a project involving various community business members and organizations. This project will include career investigation, postsecondary education requirements, required skills, application completion, interviews and internship opportunities Games and Simulation Pathway Anchors (D1.3,D1.5,D1.8, D1.9)
3. Students will develop a DreamSpark application that showcases their talent, skills and creativity. https://www.dreamspark.com/student/App-Development.aspxStudents will complete a Visual Studio First Console project application using Visual C# Express
   Software and Systems Development Pathway Anchor(C1.1,C1.2,C1.4,C3.3, C4.4,C4.5,C4.9,C5.0,C6.0)
   Games and Simulation Pathway Anchors (D7.1, D7.4, D7.5)
4. Students will complete a C# Console project that collectively covers the core principles of object-oriented C# programming and Stemfuse curriculum https://www.udemy.com/intro-c-sharp/?dtcode=lyFUkBn1Z1aq#/
5. Students will complete a bouncing ball project using XNA Game Studio program
   Software and Systems Development Pathway Anchor(C1.1,C1.4,C4.4,C4.5,C4.9,C5.0,C6.0)
   Games and Simulation Pathway Anchors (D1.2,D1.5,D1.9,D2.1,D2.3,D2.4,D2.7, D3.4,D.5.0ALL, D6.0 ALLD7.1, D7.4, D7.5)
6. Students will complete a XNA Game Studio Role-Playing Game (RPG) project which is the main emphasis of this course. Students will use C# program language to create this game. The goal of this project is to create a character (avatar), a chest (physical object) and obtain an item (which is the reward) using XML
   Software and Systems Development Pathway Anchor(C1.1,C1.4,C4.4,C4.5,C4.9,C5.0,C6.0)
   Games and Simulation Pathway Anchors (D1.2,D1.5,D1.9,D2.1,D2.3,D2.4,D2.7, D3.4,D.5.0ALL, D6.0 ALLD7.1, D7.4, D7.5)
7. Students will complete a project utilizing Kinetic and robotics programming
   Software and Systems Development Pathway Anchor (C1.0 ALL C3.0 ALL4.4,C4.5,C4.9,C5.0,C6.0)
   Games and Simulation Pathway Anchors (D1.2,D1.5,D1.9,D2.1,D2.3,D2.4,D2.7, D3.4,D.5.0ALL, D6.0 ALLD7.1, D7.4, D7.5)

B. Assessment Methods
   1. Teacher observations of day-to-day classroom participation, effort, behavior and achievement
   2. Assignments include vocabulary, problem solving, practice programming examples, and short answer written responses
   3. Students will write code by hand to solve short problems and to demonstrate mastery of programming constructs without the benefit of the integrated development environment support structure
   4. The entire class completes a series of group-based inquiry assignments with teacher guidance
   5. Quizzes
   6. Tests
   7. Writing of technical-based code to industry standards. This is a formative assessment of computer concepts and topics learned
   8. Individual projects to demonstrate programming concepts through practical application
   9. Long term projects to demonstrate the ability to use C#, XNA, Kinect and Arduino programming
   10. Student Portfolio to include: projects, art, proposals, games and applications
   11. Students will be able to participate in gaming competitions

IV. INSTRUCTIONAL MATERIALS & METHODOLOGIES

A. Required Materials: Software

1. Microsoft C# Express Edition: http://www.microsoft.com/express/product/
2. XNA Game Studio: http://www.microsoft.com/en-us/download/details.aspx?id=23714
3. Visual Studio, 2013
4. SDK
5. OpenKinect Driver
6. OpenNI
7. OfxKinect

B. Supplementary Materials
   1. Learning C# by Programming Games Hardcover – June 18, 2013 by Arjan Egges ISBN-10: 3642365795
   2. C# Game Programming: For Serious Game Creation Paperback – June 16, 2010 by Daniel Schuller ISBN-10: 1435455568
   3. Game:It Advanced from Stemfuse curriculum (ebook)
   4. Making Thing See 3D with Kinect Arduino, and Makerot by Greg Borenstein ISBN: 978-1-449-30707-3
   5. Arduino and Kinect Project Design Build Blow their Minds by Melgar and Diez ISBN: 9781430241676

C. Equipment
   1. Two large screen smart 60" TVs to test games and for Kinect programming use for group projects and classroom instruction with two computer workstations
   2. Fifteen Arduino Start-up Kits
   3. Robotic parts for the Arduino projects
   4. Fifteen project containers for 15 electronic solar robotic kits
   5. Three 3-D printer and modeling with materials (17 or 33 gage)
   6. Two Xbox Ones with four controllers each
   7. Fifteen Kinect cameras with power cord and adaptors for the computers

D. Websites
   1. https://www.udemy.com/intro-c-sharp/?dtcode=lyFUkBn1Z1aq#/
   2. http://www.microsoftvirtualacademy.com/
   3. http://www.microsoft.com/education/itacademy/Pages/member.aspx
   4. https://www.edx.org/course-list/allschools/computer-science/allcourses
   5. http://www.w3schools.com/
   6. https://www.khanacademy.org/computing/computer-programming
   7. http://www.microsoft.com/en-us/download/details.aspx?id=7029