

Orange Unified School District  
**Introduction to Video Game Design**  
Year Course

**Grade Level:** 9-12

**Prerequisites:** Fundamentals of Programming

**Introduction to the Subject:**

Introduction to Video Game Design is a comprehensive, self-contained, fully-computer integrated one-year course, which utilizes project-based learning to develop 2D and 3D PC, web, mobile device (i.e., cell phone), and DDR (Interactive Dance, Dance Revolution) games. In addition, students will be introduced to artificial intelligence with robotics. Students will further develop their practical programming skills introduced in the Fundamentals of Programming course, such as command-driven and object-oriented programming with logical data structures, sequences, Boolean logic, loops, lists, arrays, functions, methods, and graphics. The class will provide a solid foundation of programming skills, which will carry over into future computer science courses.

This career technical education course supports the California Business Education Career Path and Model Curriculum Standards for the Information Technology Industry sector, Programming and Systems Development Pathway.

**Course Objectives:**

**By the end of the course:**

- Students will learn to express themselves creatively with new technologies.
- Students will obtain intermediate computer literacy skills to be able to understand the importance of effective interfaces in the interaction between humans and computer system.
- Students will explore computational ideas through personal and meaningful projects.
- Students will maintain a digital portfolio that highlights completed projects.
- Students will communicate both verbally and in writing in a professional manner with peers, faculty, and members of the community.
- Students will understand the creation and design of animation and video programs, as well as the software development cycle.
- Students will have a basic understanding of the core concepts and techniques of computer science (software development cycle, determining hardware requirements, operating systems, networking, algorithms, logic flows), software applications, and programming languages using Adobe Flash, DarkBasic, GameMaker, Alice, Python, and the iSupport Learning Virtual Internship program, that can be applied to more mainstream projects.
- Students will use critical thinking skills such as asking questions, analyzing problems, and supporting arguments and conclusions.
- Students will use peer reviews to analyze peer work and provide problem solving feedback.
- Students will develop a knowledge and understanding of the concepts of game development (storyboarding, designing, programming, testing, debugging) to create projects from conception to completion.

- Students will demonstrate an understanding of creating a video game suited to the needs of a business model or venture that fits the budget and timeline criteria of the customer, meets the short- and long-term goals of the customer, and meets the project specifications.
- Students will understand intellectual property, privacy and non-disclosure agreements.
- Students will obtain career knowledge and goals in the computer science and video game development industries.
- Students will obtain employability skills such as time management, problem solving, critical thinking, and cooperative planning while working on projects.
- Students will develop an organizational system to maintain information including specifications, pertinent research, and design choices.
- Students will develop innovative solutions to non-familiar problems by demonstrating various types of reasoning as appropriate for the needs of the situation.
- Students will develop and practice metacognition skills by analyzing what they already know about the topic, what they need to know about the topic, how they learn best, how to get information they need, whether they fully understood what they heard, read, or learned, and whether they know when they made a mistake and why they made it.

**Recommended text(s):**

- Habgood, Jacob and Overmars, Mark, *The Game Maker's Apprentice, Game Development for Beginners*, APress 2006.
- Dawson, Michael, *Python Programming, 2<sup>nd</sup> Edition, For the Absolute Beginner*, Thompson Course Technology, 2006.

**Supplemental Text/Materials:**

- Habgood, Jacob and Overmars, Mark, *The Game Maker's Apprentice, Game Development for Beginners*, APress 2006
- Video Game Design Virtual Internship software, I Support Learning, Inc., PO Box 398, Olathe, Kansas 66051, 877-828-1216, 866-596-5109 fax, Email – Steve Waddell at [swaddell@isupportlearning.com](mailto:swaddell@isupportlearning.com)
- Handouts on web.
- Documentaries from the Discovery Channel and the History Channel.
- Episodes/excerpts from *Pokémon*, *Dragonball Z*, *Yu-Gi-Oh* animated TV shows and movies.

**Course Overview and Approximate Time Allotments**

**First Semester**

**Weeks**

- |  |    |
|--|----|
| I. Intro to Computer Science and Video Game Design, Animations and Video Games using Python and Adobe Flash  | 11 |
| A. Careers in Computer Science and Game Development industries   |    |
| • Students research job openings, salaries, education requirements needed to obtain these careers, and the higher-education programs that can provide degrees in each field. |    |
| B. Software Development Cycle  |    |
| • Students complete multiple projects using Flash and Python to teach and reinforce the software development cycle and learn Flash and Python features and functionality.    |    |
| C. Story analysis  |    |
| • Students analyze components of plot and story.   |    |

D. Students complete chapters 1-6 of the Python Programming, 2nd Edition, textbook to design, develop, test, and debug animations and video games using Python and Adobe Flash

- Students will create projects that will help them learn concepts and reinforce programming skills: by creating algorithms with pseudocode and with logical structures, loops, strings, tuples, algorithms, flowcharts, lists and dictionaries, storyboards, sequences (linear, branching, looping), Boolean logic, various graphical user interfaces (GUI), user interfaces, and animations and video games using command-driven and event-driven code.
- Students will learn what the computer is doing and why it is doing it.
- After completing animation and programming projects using step-by-step instructions, students will program a video game or animation from scratch.

II. Software development cycle reinforcement with animations and video games using Alice with Java.

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A. Design, develop, test, and debug animations and video games using Alice with Java

- Students will create projects that will help them learn concepts and reinforce programming skills. The basics of Alice are taught which include: how to add an object to a world, how to set its initial position, orientation and pose; how to animate an object by sending it a message; how to select an object's subparts; how to change an object's properties, and how to send messages simultaneously. Students create storyboards with scenes, camera movements within shots, and transitional diagrams. This includes the basic description of what happens when the user runs the program and the chronological flow of actions in the story that tell students what has to happen first, next, and so on. This leads to the understanding of an algorithm by providing a concise series of steps that specify, in order, the behavior of each object in the story and ultimately solves a problem.
- The basic syntax of the Java language is introduced. Students divide their world-level methods into scenes and shots and break down their coding structure by using divide-and-conquer strategies. Students are introduced to the difference between class-level and world-level objects and methods, and will define new behaviors for each object. Class-level methods are reused from world to world. Students start to program camera movements by learning point-of-view. Students learn that an object's position in the world determines where the object is located as the orientation is combined with the object's pitch, roll, and yaw and the Point-of-view is combined with position and orientation.
- After completing animation and programming projects using step-by-step instructions, students will program a video game or animation from scratch.

## **Second Semester**

III. Software development cycle reinforcement using DarkBasic and completing certification from the Video Game Design Virtual Internship simulation from iSupport Learning.

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A. Design, develop, test, and debug PC/web games using DarkBasic and completing a virtual internship at a video game company using iSupport Learning software.

- Students use Dark Basic to learn Basic syntax by creating projects that will help them learn and reinforce general computing concepts, such as: types, variables, input/output, conditions, objects, classes, flowcharts, sequences (linear, branching, looping), Boolean logic, software objects and classifications, graphics, sound, Animation, program development.

- Students use the virtual internship software from ISupport Learning to obtain employability skills.
- After completing animation and programming projects using step-by-step instructions, students will program a PC/Web video game and a DDR video game from scratch.

IV. Software development cycle and video game creation reinforcement using GameMaker and End of Year e-portfolio

- A. Design, develop, test, and debug PC/web games using GameMaker. 5
- Students use GameMaker to reinforce programming skills and learn scripting skills.
  - After completing animation and programming projects using step-by-step instructions, students will program a video game or animation from scratch.
- B. Create their end of year e-portfolio and website. 3
- Students use Microsoft MovieMaker to create and render a movie highlighting their top five projects of the year.
  - Students use html, xml, xhtml, and javascript to create a website that will contain descriptions of what the student learned this year and include the end of year movie.
- C. Careers in Computer Science and Game Development industries 2
- Students create their resume and cover letter, learn proper emailing techniques, follow-up with a thank you letter and email, and practice interviewing techniques.

**DATE OF LAST CONTENT REVISION: February 2008**

**DATE OF CURRENT CONTENT REVISION: August 2011**

**DATE OF BOARD APPROVAL: July 2008**

## **Addendum**

### **THE CALIFORNIA CONTENT STANDARDS**

California Business Education Career Path and Model Curriculum Standards for the Information Technology Industry Sector and Programming and Systems Pathway are:

#### **Information Technology Sector**

##### **1.0 Academics**

Students understand the academic content required for entry into postsecondary education and employment in the Information Technology sector.

##### **2.0 Communications**

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

##### **3.0 Career Planning and Management**

Students understand how to make effective decisions, use career information, and manage personal career plans.

##### **4.0 Technology**

Students know how to use contemporary and emerging technological resources in diverse and changing personal, community, and workplace environments.

##### **5.0 Problem Solving and Critical Thinking**

Students understand how to create alternative solutions by using critical and creative thinking skills, such as logical reasoning, analytical thinking, and problem-solving techniques.

##### **6.0 Health and Safety**

Students understand health and safety policies, procedures, regulations, and practices, including the use of equipment and handling of hazardous materials.

##### **7.0 Responsibility and Flexibility**

Students know the behaviors associated with the demonstration of responsibility and flexibility in personal, workplace, and community settings.

##### **8.0 Ethics and Legal Responsibilities**

Students understand professional, ethical, and legal behavior consistent with applicable laws, regulations, and organizational norms.

##### **9.0 Leadership and Teamwork**

Students understand effective leadership styles, key concepts of group dynamics, team and individual decision-making, the benefits of workforce diversity, and conflict resolution.

##### **10.0 Technical Knowledge and Skills**

Students understand the essential knowledge and skills common to all pathways in the Information Technology sector.

##### **11.0 Demonstration and Application**

Students demonstrate and apply the concepts contained in the foundation and pathway standards.

#### **Programming and Systems Development Pathway**

D1.0 Students understand the strategies necessary to define and analyze systems and software requirements.

D2.0 Students understand programming languages.

D3.0 Students understand the creation and design of a software program.

D4.0 Students understand the process of testing, debugging, and maintaining programs to meet specifications.

D5.0 Students understand the importance of quality assurance tasks in producing effective and efficient products.

D6.0 Students understand the importance of effective interfaces in the interaction between humans and computer systems.