

## **Software Engineering 3 & 4(Advanced Programming 2)**

### **COURSE DESCRIPTION AND EXPECTATIONS**

**Instructor:** Mr. Fornstrom

**Credit:** 5 Semester Hours

**Prerequisite:** 1) Algebra 3, 4 2) Computer Magnet Solution Design 1, 2

**Phone:** 720-423-7164

**E-mail:** [stacey\\_fornstrom@dpsk12.org](mailto:stacey_fornstrom@dpsk12.org)

**Website:** <http://www.fornstrom.tjcomputermagnet.com>

### **INSTRUCTOR BIO**

I have taught in the TJ Computer Magnet program for 11 years. I graduated from the University of Wyoming with a B.A. in Business Administration and from Texas A&M with a M.S. in Management Information Systems. Prior to teaching I worked as an accountant and a computer consultant for businesses.

### **COURSE DESCRIPTION**

Advanced Programming 2 is a continuation of Advanced Programming 1. The course is modeled as a college-level introduction to computer science, with a focus on object-oriented program development and applying math skills to programs. The course includes more in-depth study of problem definition, program design, object-based development, programming constructs, program analysis, data structures, standard algorithms, and computer ethics. Adobe Flash and Java are the programming languages that will be used. Each student will design and develop multiple major programs.

### **FEES**

There is a \$40 fee for this class that will be used for software, student supplies, and membership in the TJ Computer Design Club. The class fee will cover both semester 1 and semester 2. Please turn the money in to Mr. Fornstrom by **Friday September 2, 2011**. Checks should be made payable to **Thomas Jefferson High School**.

### **CLASS RULES AND PROCEDURES**

Please refer to the attached Computer Magnet class rules for details of the behavior and procedures that will be followed in class.

### **MAKE-UP and LATE WORK**

**Excused Absence:** The student will be allowed one day for each day absent, plus one extra day to make up work and tests missed.

**Unexcused Absence:** The student receives a grade of 0 for any work missed as a result of an unexcused absence.

**Late Work:** I realize there will be times when unforeseen circumstances (particularly with computers) make it difficult for work to be completed on time. If the student attended class but was unprepared with their assignment, they can turn the work in the next day for a maximum of 50% credit. No credit will be given for work turned in more than 1 day late. Please plan for the unexpected when completing assignments so that there is ample time to complete all work on time.

### **LAB & OFFICE HOURS**

The computer lab is open every day from 7am to 3pm for student project work. Mr. Fornstrom is available in the lab from 7am to 3pm. Please contact him to schedule an appointment or additional lab time.

### **GRADING**

Grading will be based upon assignments, quizzes, tests and participation points. There will also be several group projects. Each team member will earn both an individual grade and a group grade on each group project.

### **PARTICIPATION POINTS**

In order to become proficient with computers, students need to work and practice with computers. To encourage this, 3 participation points are available each class day for being here, on-time, and on task. If a student has an excused absence they may come in and make-up the computer work to receive the days participation points. Points lost for unexcused tardies or absences may not be made up. Points lost for inappropriate computer use (such as playing games or surfing the web during class time) may not be made up.

## **GRADING SCALE**

- 90-100% = A
- 80-89% = B
- 70-79% = C
- 60-69% = D
- Below 60% = F

## **COURSE CONTENT – SOFTWARE ENGINEERING 3:**

Course content will include, but is not limited to:

### **General Concepts and Software**

- Word processing using Word.
- Presentations using PowerPoint.
- Using Inspiration to organize ideas.
- Spreadsheets using Excel.
- Student blog using Wordpress.

### **Program Design**

- Problem definition
- Program design
- Work Breakdown Structures
- Task scheduling

### **Program Implementation**

- Implementation techniques – object-based development, top-down development
- Programming constructs – declarations, input and output, control
- Generic data types and functions

### **Program Analysis**

- Testing
- Debugging
- Understanding and modifying existing code
- Handling errors
- Analysis of algorithms

### **Software Development Tools & Programming Languages**

- Adobe Flash ActionScript
- Adobe Photoshop or Fireworks or other graphics tool
- Microsoft Visual Studio C#
- Java development using Eclipse
- Android program development
- Other tools as needed

### **Math Concepts used in Flash Programs**

- Coordinate planes
- Movement on a coordinate plane
- Range and domain of data points
- Slope
- Gravity
- Acceleration and deceleration
- Equilateral triangles
- Radians and degrees
- Rotation
- Linear functions
- Exponential functions

## Fall Semester Weekly Topics (subject to change)

| Wk#             | Dates                                   | Topics   |
|-----------------|---|--|
|                 | 8/19/2011                               | Course Intro, rules, logins  |
| 1               | 8/22 to 8/26                            | Paper – Project ideas for computer program<br>Review Sprite Creation, animated gif's;<br><b>Math-in-CTE pretest</b> (Fri. 8/27)  |
| 2               | 8/29 to 9/2                             | Review programming movement, using animated gif's for characters. ( <b>Math in CTE lesson #1</b> )   |
| 3               | 9/6 to 9/9                              | Flash – Falling Objects: random #'s, variables, increment a variable (scoring), assign properties to new objects, gravity<br>( <b>Math in CTE lesson #2</b> ; Th. 9/9) |
| 4               | 9/12 to 9/15                            | Complete <b>Flash Falling Objects</b> project.<br>New project: Re-create a game you find on the internet   |
| 5               | 9/20 to 9/23                            | Project: Re-create an internet game  |
| 6               | 9/26 to 9/30                            | Project: Re-create an internet game  |
| <b>End 6 Wk</b> |   |  |
| 7               | 10/3 to 10/7                            | Project: Re-create an internet game  |
| 8               | 10/10 to 10/14                          | Asteroids – program ship movement, rotation: ( <b>Math in CTE lesson #3</b> )  |
| 9               | 10/17 to 10/21                          | Asteroids – program ship movement, acceleration & deceleration: ( <b>Math in CTE lesson #4</b> )   |
| 10              | 10/24 to 10/27<br>Fall Break &<br>Conf. | Asteroids project  |
| 11              | 11/1 to 11/4                            | Using Math in programming  |
| 12              | 11/7 to 11/9                            | Using Math in programming  |
| <b>End 6 Wk</b> |   |  |
| 13              | 11/14 to 11/18                          | Start Final Project; plan DUE Weds. 11/16<br>→ 16 to 19 days for Final Project work  |
| 14              | 11/21 & 11/22<br>Thanksgiving           | Final Project Work   |
| 15              | 11/28 to 12/2                           | Final Project Work   |
| 16              | 12/5 to 12/9                            | Final Project Work   |
| 17              | 12/12                                   | Final Project Due  |
| 18              | 12/12 to 12/16                          | Final Project presentations 12/13 & 12/14<br>Final Exam  |

## **COURSE CONTENT - SOFTWARE ENGINEERING 4:**

Course content will include, but is not limited to:

### **Basics of Relational Databases and Access**

- Access and database terms.
- Tables.
- Queries.
- Forms.
- Reports.
- Relational database model.
- Data diagrams.
- Modifying tables.
- Advanced queries.
- Specifying relationships in tables and queries.
- Advanced form features.
- Analyzing data.

### **mySQL**

- mySQL terms and basics.
- Creating a mySQL database.
- Deploying mySQL database on web server.
- Users and security.

### **DreamWeaver**

- DreamWeaver basics.
- Creating a basic web page with DreamWeaver.
- Connecting to a database in DreamWeaver.
- Deploying web pages to a web server.

### **Software Project**

- Brainstorm project ideas.
- Pick a project and define requirements.
- Choose a programming language appropriate to build the project.
- Build the project.
- Present project to the class.

### **General Concepts and Software**

- Word processing using Word.
- Presentations using PowerPoint.
- Using Inspiration to organize ideas.
- Spreadsheets using Excel.
- Scanning pictures and using graphics.