East Penn School District
Secondary Curriculum

A Planned Course Statement
for
Graphics Programming

Course #369 **Grade(s) 9-12**

Department: Computer Science

Length of Period (mins.) 41 **Total Clock Hours** 123

Periods per Week 5 **Length of Course (yrs.)** 1

Type of Offering: _____**required** ___x__**elective**

CREDIT 0.5

Adopted 4/30/13

Developed by:
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Description of Course #368
Course Title: Graphics Programming

Description: This course is designed for the student who wishes to extend his/her programming background either prior to taking the AP Computer Science course or after taking it. It will be customized to every student's level of ability by providing for a wide variety of project options. Students will use Turtle Graphics in Python, Turbo C++ graphics methods, and both Karel the Robot and Processing in Java to create their projects.

Goals:

- To expose students to Python, C++, and Java by using graphics design
- To create programming solutions to problems that involve geometric figures, color, and control structures
- To animate objects on the screen with keyboard and mouse controls

Requirements:

Prerequisite: Programming Foundations (recommended 84% or better), Computer Science Foundations (recommended 84% or better), or permission of instructor.

Text:

Lambert, Kenneth A. and Nance, Douglas W. Fundamentals of C++ Understanding Programming and Problem Solving, South-Western Educational Publishing, c1998..

Key to Levels of Achievement (listed with each learning objective)

Awareness (A)	Students are introduced to concepts, forms, and patterns.
Learning (L)	Students are involved in a sequence of steps and practice activities which involve further development and allow for evaluation of process.
Understanding (U)	Students demonstrate ability to apply acquired concepts and skills to individual assignments and projects on an independent level.
Reinforcement (R)	Students maintain and broaden understanding of concepts and skills to accomplish tasks at a greater level of sophistication.

Unit	Num	Objective	Level	Content	Evaluation	Standard
I. 2-D and 3-D Graphic Design	1	Students will work in groups to discuss what makes graphics appealing to the user and concepts that are important in graphic design	A	• Collaborative working skills • Communication skills • Team-building skills	Group synopsis	ISTE 2.a ISTE 3.b
II. Scripting Language and Turtle Graphics	2	Students will learn aspects of Python to be able to create simple games and activities using loops, lists, and random numbers	U	• Scripting language • Python syntax • Turtle Graphics • Fractals • List Processing	The Chaos Game Hangman, Random Bug C Curve, Koch Snowflake Student projects Test	ISTE 2.a ISTE 2.b ISTE 3.b ISTE 4.a
III. Graphics Packages and Turbo C++ (maybe Visual C++)	3	Students will learn how to create graphical objects using lines and shapes along with how to animate an object.	R	• Functions moveto, moverel, lineto, line, linerel, outtext, outtextxy,sector, rectangle, circle, arc, bar, putpixel, and ellipse that draw objects • Functions setcolor, setbkcolor, setlinestyle, settextstyle, textheight, textwidth, fillellipse, and floodfill that modify the image • Animate an object horizontally or vertically by using getcolor and getbkcolor, then using setcolor repeatedly	Muller-Lyer illusion, smiley face, house scene, graphing functions, rolling dice, blasting off Student projects Test	ISTE 1.b ISTE 1.c ISTE 2.a ISTE 2.b ISTE 2.d ISTE 4.a ISTE 4.d ISTE 6.d
IV. Introduction to Java with Processing	4	Students will learn how to create a variety of images that involve mouse control using basic Java syntax and special Processing functions	L	• Using the setup method with functions size, background, and stroke • Using the draw method with either loop() or noloop() • Using functions to draw geometric figures using point, line, quad, rect, triangle, arc, ellipse, and fill • Using functions to display text including textFont, textAlign, and test	Moving ellipse, four-point star, etch-a-sketch, alien, floating line, bouncing ball, line to mouse, etc. Student projects Test	ISTE 3.b

				• Providng for mouse control using methods mouseX, mouseY, pMouseX, pmouseY, and mousePressed		
V. More Java and Animation with Karel the Robot		Students will learn how to give commands to a virtual robot and have it accomplish various task at varying levels of difficulty	U	• Basic Karel commands • Creating new methods • Inheritance and object-oriented techniques • Artificial intelligence	Independent projects of a student's choosing Test	ISTE 1.b ISTE 1.c ISTE 2.a ISTE 2.b ISTE 2.d ISTE 3.b ISTE 3.d ISTE 4.b ISTE 4.d ISTE 6.c ISTE 6.d