East Penn School District
Secondary Curriculum

A Planned Course Statement
for
Advanced Computer Science Topics Honors

Course #355 **Grade(s) 9-12**

Department: Computer Science

Length of Period (mins.) 41 **Total Clock Hours** 63

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

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

CREDIT .5

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Description of Course #355
Course Title: Advanced Computer Science Topics (Honors)

Description: This is a project-based course where students will use and extend their prior programming knowledge in a language(s) of their choice. Students will create and present projects that could include web-based applications, graphics and animation, 3-D game design, database processing, graph theory, GUI interfaces, artificial intelligence, simulations and learning new languages.

Goals:

- To enable students to extend their programming ability by creating unique projects that extend their current knowledge in a language of their choice
- To gain exposure to various advanced fields in the study of computer science
- To work collaboratively to present information and solve computer-oriented problems that involve multiple algorithms

Requirements:

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

Text:

Various resource books – no single text

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.

Course Objectives – Advanced Computer Science Topics Honors

Unit	Num	Objective	Level	Content	Evaluation	Standard
I. Working Environments	1	Students will create a collaborative, efficient, and effective working environment to create and present computer science products	A	• Collaborative working skills • Communication skills • Team-building skills	Student observation	ISTE 2.a ISTE 3.b
II. Topics in Program Development	2	Students will be exposed to a variety of sophisticated computer science applications.	U	• Artificial Intelligence • Graph Theory • Fractals • Complier Design • 3-D Graphics • Animation • Graphical User Interface (GUI) • File Manipulation • Simulations	Student presentations Test	ISTE 2.a ISTE 2.b ISTE 3.b ISTE 4.a
III. Create Student Projects	3	Students will work collaboratively to create one or more computer science projects using the language of their choice.	R	• Optional content may include the use of C++, Visual BASIC, Python, Alice, and/or Java. • File input and output • Graphics and animation • Randomization • Gaming environments • Mouse-driven GUI • Storyboarding • File manipulation • Form handling • List handling	Student presentation and student project once per quarter (continuation of original project or creation of new for second quarter)	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. Creating Web Applications	4	Students will learn how to create a basic HTML document.	L	• Identify key tags needed for every web page • Know how to create web-based applications using JavaScript	Quiz	ISTE 3.b
		Students will create a web-based application to show-case their work.	U	• Utilize tags for page titles, text information, images, links to other web pages and programming applications • Communicate orally and demonstrate their product to a diverse audience of students, teachers, and/or administrators • Document their work so that others may use, modify, and understand it in the future	Successful completion of web-based product that will be evaluated by panel of educators.	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