



monarch

Curriculum Catalog

Career and Technical Education Series

Fundamentals of Programming and
Software Development

Table of Contents

FUNDAMENTALS OF PROGRAMMING AND SOFTWARE DEVELOPMENT COURSE OVERVIEW..... 1
UNIT 1: INTRODUCTION TO COMPUTERS 1
UNIT 2: PROGRAMMING LANGUAGES 3
UNIT 3: INTRODUCTION TO PROGRAMMING..... 3
UNIT 4: CONTROL BLOCKS 3
UNIT 5: GUI PROGRAMMING AND WEB APPLICATIONS..... 4
UNIT 6: COURSE PROJECT, REVIEW, AND EXAM..... 4

Fundamentals of Programming and Software Development Course Overview

This course will provide students with an understanding of basic software development concepts and practices, issues affecting the software industry, careers within the software industry, and the skills necessary to perform well in these occupations.

Students will learn details about core concepts in programming using Java, including writing and debugging code, proper syntax, flow of control, order of operations, comparison operators, and program logic tools and models. They will learn the function of key program techniques including if statements, looping, and arrays. They will also learn about web development using HTML and drag-and-drop development of user interfaces in an Integrated Development environment.

Students will also learn about the Software Development Life Cycle and the different variations used to create software. They will learn about different programming languages and paradigms. They will learn about the importance of usability and user-centered design processes. Students will also learn about careers in the software industry, the education and skills required to work in the industry, and related career resources. Finally, the capstone project will allow students to explore and state opinions on key issues and trends impacting the software industry, and to learn about the experience of working in the industry.

Objectives

- Understand the relationship between computer hardware and software.
- Describe the purpose and high-level organization of the central processing unit.
- Understand categories of software and be able to properly assign software products into the correct category.
- Describe the key functions of systems software.
- Describe the functionality of popular software applications (e.g., word processing, database management, spreadsheet development).
- Understand the function and operation of compilers and interpreters.

For topics in this course, it is helpful for students to be familiar with the basics of using desktop and laptop computers as well as accessing websites over the Internet.

If students are unfamiliar with these topics, it is recommended, though not required, that they familiarize themselves with creating and saving files in a text editing or word processing application and with using web browsers and conducting searches on the Internet.

Additionally, activities in this course require that the Java Software Development Kit (SDK) and the NetBeans Integrated Development Environment (IDE) is installed on students' computers. Instructions are included in the Unit 1 lesson titled "Introduction to Java Programming."

Unit 1: Introduction to Computers	
Assignments	
1. Course Overview	10. Project: Writing Your First Java Program
2. Computer History	11. Java Syntax Overview
3. Project: Computer Generations	12. Project: Hello World! Documentation
4. Introduction to Computer Hardware	13. Quiz 2: How Computers and Programs Think
5. Project: Understanding Hardware	14. Special Project*
6. Introduction to Computer Software	15. Unit 1 Test
7. Quiz 1: Perspective and Foundations	16. Course Project Part 1: The Impact of GUI Computing*
8. Design and Function of the Central Processing Unit	17. Glossary and Credits
9. Introduction to Java Programming	

Fundamentals of Programming and Software Development	Unit 2: Programming Languages	
	Assignments	
	1. Introduction to Java Variables	9. Switch and Case
	2. Project: Using Variables in Java	10. Project: Using Switch-Case and Nested If Statements
	3. Java Math Operations	11. User-Defined Methods
	4. Project: Using Mathematical and Comparison Operators in Java	12. Quiz 2: Branching and Methods
	5. Operators and Escape Sequences	13. Special Project*
	6. Quiz 1: Processing Data	14. Unit 2 Test
	7. New Data Types and the If Statement	15. Course Project Part 2: Ethics in Programming*
	8. Project: Using If and If-Else Statements and Reading User Input	16. Glossary and Credits

Fundamentals of Programming and Software Development	Unit 3: Introduction to Programming	
	Assignments	
	1. Introduction to the For Loop	10. Parallel and Multidimensional Arrays
	2. Project: Grading on a Loop	11. Project: The Logic of Multidimensional Arrays
	3. Loops–Practice with the Do-While Loop	12. Quiz 2: Managing Complex Data
	4. Loops–Practice with the While Loop	13. Special Project*
	5. Project: Using Loops in a Guessing Game	14. Unit 3 Test
	6. Quiz 1: Loops–Power and Simplicity	15. Course Project Part 3: The Life of a Software or Web Developer*
	7. Arrays–Syntax and Use	16. Glossary and Credits
	8. Arrays–Passing by Reference	
	9. Project: Professional Associations Research	

Fundamentals of Programming and Software Development	Unit 4: Control Blocks	
	Assignments	
	1. Classes and Objects	9. HTML Images, Links, and Web Development Tools
	2. Project: The Importance of Usability	10. Project: Your Favorite Recipe – On a Web Page
	3. Constructors and Packages	11. Event-Driven Programming and Visual Basic
	4. Project: Creating Packages	12. Quiz 2: Interactive and Graphical Programming
	5. Flowcharts Mapping	13. Special Project*
	6. Quiz 1: Program Components and Logic	14. Unit 4 Test
	7. HTML Basics	15. Course Project Part 4: Open-Source Programming*
	8. Project: A Web Page Essay About the Web	16. Glossary and Credits

Fundamentals of Programming and Software Development	Unit 5: GUI Programming and Web Applications	
	Assignments	
	1. Software Development Life Cycle	11. New Trends and Technologies
	2. Project: Planning a Software Development Project	12. Quiz 2: Preparing for a Career in Software Development
	3. Programming Languages	13. Special Project*
	4. User-Centered Software Design	14. Unit 5 Test
	5. Project: User-Testing a Product Prototype	15. Course Project Part 5: Impacts of Future Technologies*
	6. Quiz 1: Creating Software Products	16. Glossary and Credits
	7. Skills and Interests for Software Careers	
	8. Project: Taking Stock	
	9. Software Industry Careers	
	10. Project: Planning Your Computer Science Degree Program	

FPSD	Unit 6: Course Project, Review, and Exam	
	Assignments	
	1. Course Project Part 6: Issues and Experiences in the World of Software Development*	2. Review
		3. Exam

(*) Indicates alternative assignment