NFC ACADEMY

FUNDAMENTALS OF PROGRAMMING AND SOFTWARE DEVELOPMENT

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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.

Fundamentals of Programming and Software Development Course Requirements

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.

Fundamentals of Programming and Software Development Course Outline

This course requires independent research and work from the student. Students should have a high interest in this course for the most success.

- **UNIT 1 - INTRODUCTION TO COMPUTERS**
  - **Course Overview**
  - **Computer History**
  - **Project: Computer Generations – Complete this project assignment Computer Generations.**
  - **Introduction to Computer Hardware**
  - **Project: Understanding Hardware – Complete this project assignment Understanding Hardware.**
  - **Introduction to Computer Software**
  - **Quiz 1: Perspective and Foundations**
  - **Design and Function of the Central Processing Unit**
  - **Introduction to Java Programming**

- **Project: Writing Your First Java Program - – Complete this project assignment Writing Your First Java Program.**
- **Java Syntax Overview**
- **Quiz 2: How Computers and Programs Think**
- **Unit 1 Test**
- **Course Project Part 1: The Impact of GUI Computing – Complete this first part to the Course Project The Impact of GUI Computing.**
- **Glossary and Credits**

- **UNIT 2 - PROGRAMMING LANGUAGES**
  - **Introduction to Java Variables**
  - **Project: Using Variables in Java – Complete this project assignment Using Variables in Java.**
  - **Java Math Operations**
  - **Operators and Escape Sequences**
  - **Quiz 1: Processing Data**
  - **New Data Types and the If Statement**
  - **Project: Using If and If-Else Statements and Reading User Input – Complete this project assignment Using If and If-Else Statements and Reading User Input**
  - **Switch and Case**
  - **User-Defined Methods**
  - **Quiz 2: Branching and Methods**
  - **Unit 2 Test**
  - **Course Project Part 2: Ethics in Programming - Complete this next part to the Course Project Ethics in Programming.**
  - **Glossary and Credits**

- **UNIT 3 - INTRODUCTION TO PROGRAMMING**
  - **Introduction to the For Loop**
  - **Project: Grading on a Loop – Complete this project assignment Grading on a Loop.**
  - **Loops–Practice with the Do-While Loop**
  - **Loops–Practice with the While Loop**
  - **Quiz 1: Loops–Power and Simplicity**
  - **Arrays–Syntax and Use**
  - **Arrays–Passing by Reference**

- **Project: Professional Associations Research – Complete this project assignment Professional Associations Research.**
- **Parallel and Multidimensional Arrays**
- **Project: The Logic of Multidimensional Arrays**
- **Quiz 2: Managing Complex Data**
- **Unit 3 Test**
- **Course Project Part 3: The Life of a Software or Web Developer - Complete this next part to the Course Project The Life of a Software or Web Developer.**
- **Glossary and Credits**

- **UNIT 4 - CONTROL BLOCKS**
  - **Classes and Objects**
  - **Project: The Importance of Usability**
  - **Constructors and Packages**
  - **Project: Creating Packages – Complete this project assignment Creating Packages.**
  - **Flowcharts Mapping**
  - **Quiz 1: Program Components and Logic**
  - **HTML Basics**
  - **Project: A Web Page Essay About the Web – Complete this project assignment A Web Page Essay About the Web.**
  - **HTML Images, Links, and Web Development Tools**
  - **Event-Driven Programming and Visual Basic**
  - **Quiz 2: Interactive and Graphical Programming**
  - **Unit 4 Test**
  - **Course Project Part 4: Open-Source Programming - Complete this next part to the Course Project Open-Source Programming.**
  - **Glossary and Credits**

- **UNIT 5 - GUI PROGRAMMING AND WEB APPLICATIONS**
  - **Software Development Life Cycle**
  - **Project: Planning a Software Development Project – Complete this project assignment Software Development Project.**
  - **Programming Languages**
  - **User-Centered Software Design**
  - **Quiz 1: Creating Software Products**

- **Skills and Interests for Software Careers**
- **Software Industry Careers**
- **Project: Planning Your Computer Science Degree Program – Complete this project assignment Planning Your Computer Science Degree Program.**
- **New Trends and Technologies**
- **Quiz 2: Preparing for a Career in Software Development**
- **Unit 5 Test**
- **Course Project Part 5: Impacts of Future Technologies - Complete this next part to the Course Project Impacts of Future Technologies.**
- **Glossary and Credits**

- **UNIT 6 - COURSE PROJECT, REVIEW, AND EXAM**
  - **Course Project Part 6: Issues and Experiences in the World of Software Development - Complete this final part to the Course Project Issues and Experiences in the World of Software Development.**
  - **Review**
  - **Exam**