

## Course Overview

Hello, and welcome to the **Introduction to Software Engineering** course.

In this course, you will be introduced to the foundational concepts of software engineering and explore the various stages of the software development lifecycle (SDLC). You will gain an understanding of how high-quality software is built, the roles and responsibilities in software teams, and the tools and technologies used in modern software development.

You'll explore topics such as application development (front-end and back-end), basics of programming with Python, and software design and architecture. This course also provides valuable insights into the various career paths in software engineering, the day-to-day responsibilities of a software engineer, and the essential skills required in the field.

In the hands-on labs, you'll practice writing and executing code using an integrated development environment (IDE) and explore tools used by software developers. You'll conclude the course with a final assessment and a project based on real-world job opportunities in software engineering.

## Course Objectives

After completing this course, you will be able to:

- Explain the stages of the software development lifecycle (SDLC) and elements of quality software
- Identify different approaches to software development and explore team dynamics and career opportunities
- Differentiate between front-end and back-end development and identify key technologies used
- Describe basic programming concepts and write simple Python code
- Explain the importance of software architecture and design, and use UML to communicate system structure and behavior
- Identify the roles, skills, and ethical responsibilities of software engineers

## Course Outline

This course has six modules, which are listed below. We encourage you to set aside several hours to complete this course successfully. Consistency will help you achieve your learning goals!

You will benefit from viewing all videos and readings and strengthening that knowledge by completing all activities.

### Module 1: The Software Development Lifecycle

This module provides you with an overview of the field of software engineering. In the first lesson of this module, you will be introduced to the field of software engineering and learn about the software development lifecycle (SDLC), elements of building high-quality software, and writing requirements. In lesson two, you will explore different approaches to building software and different career opportunities related to software development. You will also hear from experienced practitioners in the field and learn how different roles interact and work as a team to develop enterprise-level software.

### Module 2: Introduction to Software Development

This module introduces you to the concepts of application development. In lesson 1, you'll learn about the differences between front-end and back-end development in web and cloud applications and the technologies used. You'll also learn how working in teams and pairs can enhance the development process and make it more efficient. In lesson 2, you will explore many of the application development tools that a software engineer uses to write, test, and release code, and be introduced to software stacks that support the execution of an application. Finally, in the hands-on lab, you'll learn how to use an integrated development environment (IDE) to develop and run code.

### Module 3: Basics of Programming

This module introduces you to the basics of programming. In the first lesson, you will learn about the different categories of programming languages and the scenarios to which each is suited. You'll also learn how to plan and organize your code effectively. In lesson 2, you will explore basic programming logic and investigate programming concepts such as identifiers, functions, and objects. Finally, you'll learn how to write simple Python code in the hands-on lab.

### Module 4: Software Architecture, Design

In this module, you will learn about the foundations of enterprise software development. Lesson 1 introduces you to software architecture and explains the importance of well-designed architecture. You will also learn about the design process, including structural design, behavioral models, and how to create Unified Modeling Language (UML) diagrams to communicate a software's structure and behavior to all team members. You will also consider object-oriented analysis and design (OOAD). In lesson 2, you will explore a variety of architectural patterns that support the architectural design process in a hands-on activity. Lastly, you will learn about the software production environment and some of the components required for deployment.

## Module 5: Job Opportunities and Skillsets in Software Engineering

In this module, you will learn about the tasks of a software engineer and what they do on a day-to-day basis. You will discover the hard and soft skills needed to become a successful software engineer. You will also investigate the job outlook for a software engineer, get a clear understanding of different software engineering career paths, and learn about various software engineering job titles and the responsibilities of those roles. You will also learn about the software engineering code of ethics.

## Module 6: Final Quiz and Final Project

This is the final module of the course, which contains the final assessment and final project. Both the assessment and the project address topics from all other modules in the course. The final assessment contains a total of 20 multiple-choice questions, comprised of four questions about each module. For the final project, you will analyze a job posting in light of what you learned in the course.

## Tools/Software used

This course is accessible via any modern web browser on desktops, tablets, or smartphones. You'll gain practical experience using an integrated development environment (IDE) and other development tools common in the software industry.