WYWM
Software Development Pathway

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SOFTWARE

What is it about?

Software is everywhere. From your microwave to your car, and every device and app in between.

Software development is the practice of using code to build tools and solve real problems. But it's more than just code...

Software Developers gather requirements, design solutions, build software, test it, release it to users and keep it running – the whole software development life cycle.

WYWM Software Development courses

- Principles of Programming
- Introduction to Web Development
- Python Programming Fundamentals
- DevOps Fundamentals
- Intermediate Web Development
- Big O Notation (Time Complexities)
- Source Control Fundamentals
- Software Quality Assurance Testing Fundamentals
- Java Fundamentals
- C Programming and Embedded Systems Development
- FPGA Engineering

Principles of Programming

Learning objectives
Programming is a key skill for any professional looking to improve their job prospects in the IT industry. This course is aimed at giving students a foundation knowledge of programming concepts and principles.

We will cover:

- Types, variable and constants
- Conditions
- Loops
- Arrays and nested loops
- Subroutines
- Classes

Prerequisites:	Nil
Course Hours:	5-10 hrs
Assessments:	Nil
Difficulty:	Intermediate

Introduction to Web Development

Learning objectives
In this course, we'll walk you through the creation of your first website, prepare you to build projects with confidence and ensure you're ready for more advanced coding courses.

By the end of the course, you will have an understanding of:

- How to write code in HTML, CSS, and JavaScript
- Designing and building simple websites
- Using web development tools
- Accessing technical documentation

Prerequisites:	Principles of Programming
Course Hours:	10-15 hrs
Assessments:	Formative Quizzes
Difficulty:	Intermediate

Python Programming Fundamentals

Learning objectives
Named not for the genus of constricting snake, but instead for the old British comedy group Monty Python, Python is a widely-used, interpreted, object-oriented and high-level programming language with dynamic semantics, used for general-purpose programming.

This course aims to give students a foundational knowledge of Python programming concepts and principles. We will develop your understanding of programming using Python syntax and focus on developing a mindset around development.

Topics include:

- Variables and data types
- Repetition structures
- Data structures
- Object orientated programming

Prerequisites:	Principles of Programming
Course Hours:	30-50 hrs
Assessments:	Formative Quizzes & Summative Assessment
Difficulty:	Beginner

DevOps Fundamentals

Learning objectives
An understanding of DevOps is a crucial skill for any professional looking to improve their job prospects in the IT industry. DevOps brings a collaborative approach to software development, testing and deployment. It puts small teams with varying objectives together to work toward more efficient and high-quality code releases.

This course is aimed at giving students a foundational knowledge of DevOps including:

- Concepts and principles
- Culture and terminology
- Principles and practices
- Tools and the cloud

Prerequisites:	Nil
Course Hours:	10 hrs
Assessments:	Formative Quizzes & Assessments
Difficulty:	Intermediate

Intermediate Web Development

Learning objectives
In Intermediate Web Development, we cover essential CSS techniques, starting with the ever-popular Bootstrap library, a CSS library that gives us the power of Sass Script. The Flex Box Model is also a must-learn for any web developer and we will cover forms and regular expressions before showing you how to build an online store using Bootstrap.

The course will cover:

- CSS techniques
- Bootstrap
- Flex Box Model
- Forms and regular expressions
- JavaScript and jQuery subroutines
- Classes

Prerequisites:	Introduction to Web Development
Course Hours:	80 hrs
Assessments:	Formative Quizzes
Difficulty:	Intermediate

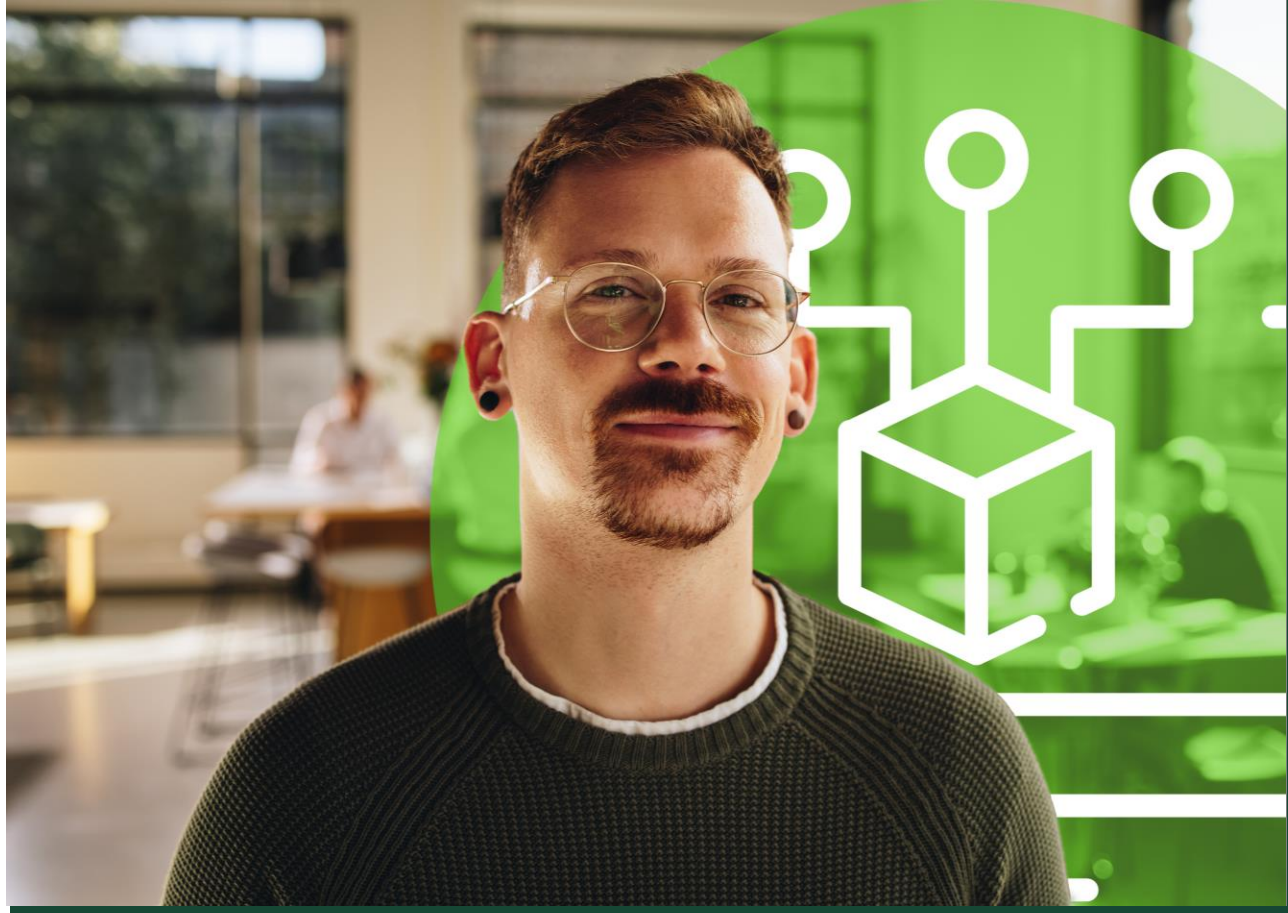
Big O Notation (Time Complexities)

Learning objectives
In computer science, Big O notation is used to classify algorithms according to how their running time increases as the input size grows. Big O notation formalises the notion of how long an algorithm takes to run. We use it to describe the worst-case runtime.

By taking this course, you can optimise your code to be more efficient. This course will also help you understand why code can take a lot longer to run if you do it wrong!

After completing this course, students will be able to:

- Identify the time complexity of an algorithm on a graph
- Explain why the time complexity of an algorithm is given a specific label
  - O(1)
  - O(log n)
  - O(n)
  - O(n2)
  - O(n log n)
- Interpret algorithms to determine their time complexity



Prerequisites:	Nil
Course Hours:	5-10 hrs
Assessments:	Nil
Difficulty:	Intermediate

Source Control Fundamentals

Learning objectives
In Source Control Fundamentals, we will start by building your understanding of the basics of Github and the Git protocol, then teach you how to leverage its functionality and commands before looking at the built-in Git extensions in VS Code. We will also cover some of the essential Git techniques for version control.

The course finishes with a real-life scenario on how Git is used among a team of developers to ship a product.

Prerequisites:	Principles of Programming
Course Hours:	10-15 hrs
Assessments:	Formative Quizzes
Difficulty:	Beginner

Software Quality Assurance Testing Fundamentals

Learning objectives
This course is designed to provide an understanding of software quality assurance testing fundamentals.

By the end of this course, students will be able to:

- Recognise the fundamentals of testing
- Describe testing throughout the software development lifecycle
- Describe static testing
- Identify test techniques
- Describe test management

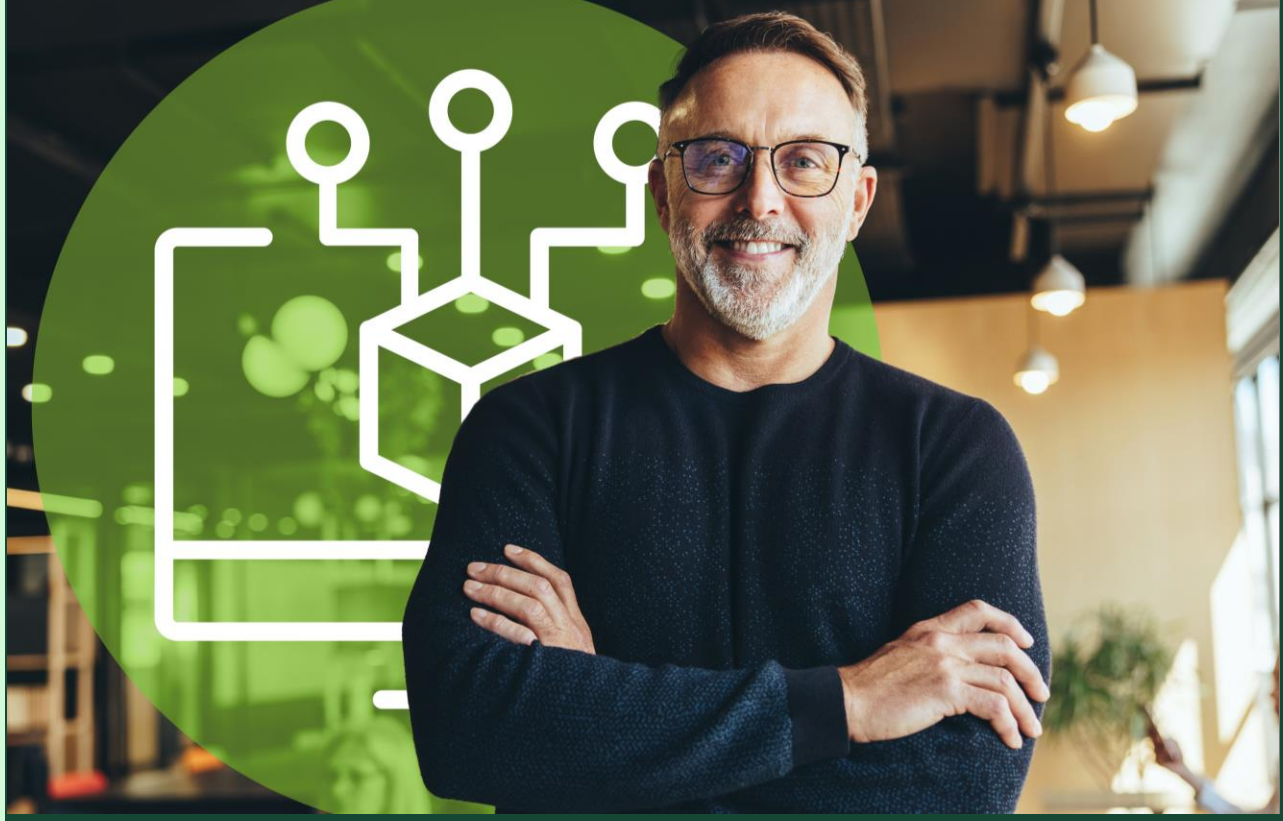
Prerequisites:	Nil
Course Hours:	5-10 hrs
Assessments:	Formative Assessment Quiz
Difficulty:	Beginner

Java Fundamentals

Learning objectives
In this course, you will learn the basics of the Java language. Each module will have associated coding challenges to evaluate your skills and understanding.

By the end of the course, you will be able to:

- Create and run a basic Java application
- Identify the components of a Java application
- Declare and initialise variables
- Use Java operators
- Control program flow with Logic Flow
- Create and use functions
- Understand Scope for variables and functions
- Handle exceptions
- Create and use arrays
- Format data for output
- Read data from user input
- Demonstrate an understanding of importing libraries and packages
- Construct basic object-oriented solutions based on given requirements (as demonstrated in Java assessment)



Prerequisites:	Principals of Programming
Course Hours:	50-80 hrs
Assessments:	Formative Quizzes & Summative Assessment
Difficulty:	Intermediate

C Programming and Embedded Systems Development

Learning objectives

This course provides an in-depth journey into C programming, leading to embedded systems programming. Covering essential topics like data structures, memory management and control structures, the course advances into microcontroller programming, real-time systems and hardware interfacing

Prerequisites:	Nil
Course Hours:	30-40 hrs
Assessments:	Nil
Difficulty:	Intermediate

FPGA Engineering

Learning objectives

The FPGA Engineering course provides a comprehensive introduction to the world of Field-Programmable Gate Arrays (FPGAs).

Starting with the fundamentals of digital systems and circuitry, you will explore hardware description languages, FPGA computing systems, and advanced concepts such as partial dynamic reconfiguration.

Prerequisites:	Nil
Course Hours:	30-40 hrs
Assessments:	Nil
Difficulty:	Intermediate

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