



# ELITE

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074 389 389 9

### 2023

# Python Certificate Course

## AI with Python:

### Empowering Students to Shape Tomorrow's Technology Building

This comprehensive Python course is tailored for university students seeking a strong foundation in programming and an exciting introduction to the world of Artificial Intelligence (AI). Designed to accommodate beginners and those with prior programming experience, this course covers Python from its fundamental concepts to advanced programming topics. Additionally, students will delve into the intriguing field of AI, exploring its applications and understanding how Python plays a crucial role in AI development.

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## ADVERTISEMENT



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## Course Description

This comprehensive Python course is tailored for university students seeking a strong foundation in programming and an exciting introduction to the world of Artificial Intelligence (AI). Designed to accommodate beginners and those with prior programming experience, this course covers Python from its fundamental concepts to advanced programming topics. Additionally, students will delve into the intriguing field of AI, exploring its applications and understanding how Python plays a crucial role in AI development.

## Course Contents

Lesson Number	Topic	Description
<b>Module 1 - Introduction to Python</b>		
01	<b>Course Introduction and Setup.</b>	<ol style="list-style-type: none"><li>1. Overview of the course objectives and relevance.</li><li>2. Step-by-step guidance on installing Python and configuring a development environment.</li></ol>
02	<b>Python Basics (Syntax, Variables, Data Types).</b>	<ol style="list-style-type: none"><li>1. Understanding Python's easy-to-read syntax.</li><li>2. Introduction to variables and the different data types Python supports.</li><li>3. Demonstrating how Python automatically handles data type conversion.</li></ol>
03	<b>Input and Output</b>	<ol style="list-style-type: none"><li>1. Techniques for gathering input from users using input().</li><li>2. Methods for displaying output and formatting text for clarity.</li><li>3. Practical applications in real-world scenarios.</li></ol>
04	<b>Control Flow (if statements, loops)</b>	<ol style="list-style-type: none"><li>1. Conditional statements to make decisions in Python code.</li><li>2. Various looping constructs for automating repetitive tasks.</li><li>3. Special control flow statements like break and continue for loop control.</li></ol>
05	<b>Functions and Modules</b>	<ol style="list-style-type: none"><li>1. Functions as reusable blocks of code with parameters and return values.</li><li>2. The concept of modules for organizing and reusing code.</li><li>3. How to import and utilize functions and modules effectively.</li></ol>

## Module 2 - Data Structures

06	<b>Lists and Tuples</b>	<ol style="list-style-type: none"><li>1. Lists as ordered collections of items with various operations</li><li>2. Tuples as immutable sequences.</li><li>3. Efficient list comprehension for concise list generation.</li></ol>
07	<b>Dictionaries</b>	<ol style="list-style-type: none"><li>1. Dictionaries for key-value storage and retrieval.</li><li>2. Dictionary methods for manipulating data.</li><li>3. Applications involving dictionaries in Python programs.</li></ol>
08	<b>Sets</b>	<ol style="list-style-type: none"><li>1. Sets as unordered collections of unique items.</li><li>2. Set operations like union, intersection, and difference.</li><li>3. Use cases for sets, such as eliminating duplicates.</li></ol>
09	<b>Strings and String Manipulation</b>	<ol style="list-style-type: none"><li>1. Strings and their properties, such as indexing and slicing.</li><li>2. Techniques for manipulating and formatting strings.</li><li>3. Real-world examples illustrating the power of string operations.</li></ol>
10	<b>Lists, Tuples, and Dictionary Manipulation</b>	<ol style="list-style-type: none"><li>1. Advanced operations combining these data structures.</li><li>2. Solving complex problems through data manipulation.</li><li>3. Practical exercises for hands-on experience.</li></ol>



### Module 3 - Object-Oriented Programming (OOP)

11	<b>Classes and Objects</b>	<ol style="list-style-type: none"><li>1. Classes and objects as fundamental OOP concepts.</li><li>2. How to define classes and create objects from them.</li><li>3. Class attributes and methods for modeling real-world entities.</li></ol>
12	<b>Inheritance and Polymorphism</b>	<ol style="list-style-type: none"><li>1. Inheritance for creating hierarchies of classes.</li><li>2. Polymorphism and method overriding for flexible code.</li><li>3. Utilizing super() for base class method access.</li></ol>
13	<b>Encapsulation and Abstraction.</b>	<ol style="list-style-type: none"><li>1. Encapsulation for data protection and privacy.</li><li>2. Abstraction and abstract classes for modeling complex systems.</li><li>3. Access modifiers in Python for controlling data visibility.</li></ol>
14	<b>File Handling</b>	<ol style="list-style-type: none"><li>1. Reading and writing data to and from text files.</li><li>2. Safe and efficient file management using the with statement.</li><li>3. Handling exceptions that may arise during file operations.</li></ol>

Module 4 - Introduction to Artificial Intelligence (AI)		
14	<b>Understanding Artificial Intelligence</b>	<ol style="list-style-type: none"> <li>1. Introduction to the field of Artificial Intelligence (AI).</li> <li>2. Historical developments and real-world applications of AI.</li> <li>3. The role of Python in AI development.</li> </ol>
15	<b>Machine Learning Fundamentals</b>	<ol style="list-style-type: none"> <li>1. Overview of machine learning and its subfields.</li> <li>2. Supervised, unsupervised, and reinforcement learning.</li> <li>3. Practical examples of machine learning in Python.</li> </ol>
16	<b>Introduction to Neural Networks</b>	<ol style="list-style-type: none"> <li>1. Explanation of neural networks and their building blocks.</li> <li>2. Deep learning and its impact on AI.</li> </ol>
17	<b>AI Ethics and Bias</b>	<ol style="list-style-type: none"> <li>1. Discussion of ethical considerations in AI development.</li> <li>2. Understanding bias in AI algorithms and its consequences.</li> <li>3. Responsible AI practices and guidelines.</li> </ol>
18	<b>Practical AI Applications</b>	<ol style="list-style-type: none"> <li>1. Real-world AI use cases across various industries.</li> <li>2. Demonstrations of AI-powered applications in Python.</li> <li>3. Opportunities for students to explore AI projects.</li> </ol>
19	<b>AI and Python Integration</b>	<ol style="list-style-type: none"> <li>1. How Python is used to implement AI algorithms and models.</li> <li>2. Libraries and tools for AI development in Python.</li> <li>3. Combining Python programming skills with AI concepts.</li> </ol>

## **Module 1: Introduction to Python**

This module serves as the foundation, introducing students to Python programming. They will learn Python's syntax, basic data types, control flow, functions, and modules, ensuring a solid grasp of essential programming concepts.

## **Module 2: Data Structures**

In this module, students dive into data structures such as lists, tuples, dictionaries, and sets. They'll explore how to manipulate and utilize these structures effectively in Python, enabling them to work with complex data.

## **Module 3: Object-Oriented Programming (OOP)**

This module focuses on object-oriented programming principles, including classes, objects, inheritance, and encapsulation. Students will learn how to design and implement object-oriented solutions using Python.

And Also, module covers advanced Python topics like exception handling, regular expressions, functional programming, and an overview of the Python standard library. Students will acquire skills for writing robust and versatile Python programs.

## **Module 4: Introduction to Artificial Intelligence (AI)**

The newly added AI module introduces students to the fascinating world of artificial intelligence. They'll gain an understanding of AI concepts, machine learning fundamentals, data preprocessing, neural networks, ethical considerations, and practical AI applications. This module highlights the synergy between Python programming and AI development, providing a glimpse into the future of technology.

These modules collectively provide a comprehensive Python course that equips students with programming fundamentals, data manipulation skills, object-oriented design principles, advanced Python capabilities, and an introduction to the exciting field of artificial intelligence.



## Course Highlights:

- **Solid Python Fundamentals:** Learn Python from scratch, starting with basic syntax and progressing to advanced concepts like object-oriented programming, data structures, and handling exceptions.
- **Practical Coding Exercises:** Gain hands-on experience through a multitude of programming exercises and projects that reinforce your Python skills.
- **Introduction to AI:** Discover the fascinating world of Artificial Intelligence, its historical context, and real-world applications. Explore machine learning, neural networks, and the ethics surrounding AI development.
- **Data Manipulation:** Master data manipulation techniques, including preprocessing, cleaning, and feature engineering, all essential for AI and machine learning.
- **Deep Learning Fundamentals:** Get introduced to neural networks and deep learning.
- **AI Ethics:** Understand the ethical considerations and challenges in AI development, focusing on bias and responsible AI practices.
- **Real-World Applications:** Explore practical AI use cases across various industries, ranging from healthcare to finance, and see Python-powered AI applications in action.
- **Integration of Python and AI:** Discover how Python seamlessly integrates with AI and machine learning, allowing you to apply your programming skills to cutting-edge technology.

## Why Take This Course?

- **Relevance:** Python is one of the most widely used languages in AI and data science. This course equips you with Python skills that are highly sought after in the job market.
- **Versatility:** Whether you're interested in software development, data analysis, or AI research, Python is a versatile language that opens doors to diverse career paths.
- **Hands-On Learning:** Through numerous coding exercises and projects, you'll develop practical programming skills that you can immediately apply in your academic and professional endeavors.
- **AI Exposure:** Gain a foundational understanding of AI and machine learning, preparing you for more advanced AI courses or AI-related projects.



- **Prerequisites:** Basic computer science knowledge is recommended but not required. No prior programming experience is necessary.

### Course Evaluation:

- Quizzes and Homework Assignments: 30%
- Final Project (AI Implementation): 50%
- Class Participation and In-Class Exercises: 20%

Join us on a journey to master Python programming and dive into the exciting world of Artificial Intelligence. Whether you're a computer science major, data enthusiast, or simply curious about AI, this course will empower you with valuable skills and knowledge that can propel your academic and professional aspirations. Don't miss the opportunity to embark on this coding adventure!

