

CS-120; Fundamentals of Python Programming & IoT Lab

Course Title	Fundamentals of Python Programming & IoT Lab	Course Code	CS-120
Semester	I Year	Course Group	Practical
Teaching Scheme in Periods (L: T: P)	30:00:60	Credits	2
Methodology	Lecture+ Practice	Total Contact Periods:	90 Periods
CIE	60 Marks	SEE	40 Marks

On completion of course the student should be able to;

CO1	Apply basic Python programming concepts such as variables, data types, operators, input/output operations, control structures, and functions to develop modular Python programs.
CO2	Develop Python programs using data structures and file handling techniques for efficient data storage, retrieval, and processing.
CO3	Interface Arduino with the ESP8266 Wi-Fi module and implement basic IoT communication and device control applications.
CO4	Develop IoT-based monitoring systems using Arduino by interfacing sensors and implementing cloud-based data acquisition and home automation applications.
CO5	Design and implement IoT-based automation applications using Arduino for real-world applications such as street light control and DC motor speed control.

Experiment 1

Aim: Installation of Python and IDE Setup

- Install Python (Anaconda / Python IDLE / VS Code)
- Verify installation
- Execute the first Python program

Experiment 2

Aim: Programs using Variables, Data Types and Operators

- Arithmetic, relational and logical operators
- Type conversion
- Simple expressions

Experiment 3

Aim: Input–Output Operations

- Read user input
- Formatted output using `format()` and f-strings
- Simple mathematical computations

Experiment 4

Aim: Simple Python Programs

- Leap year checking
- Biggest among three numbers
- Number reversal

Experiment 5

Aim: Programs using Conditional and Looping Statements

- Armstrong number
- Palindrome
- Factorial
- Sum of N natural numbers
- Prime numbers within the given range

Experiment 6

Aim: Modular Programming using Functions

- User-defined functions
- Function arguments and return values
- Modular programming

Experiment 7

Aim: Programs using Python Data Structures

- Lists
- Tuples
- Dictionaries
- Sets

Experiment 8

Aim: File Handling

- Read and write text files
- CSV file handling
- Simple data logging

Experiment 9

Aim: Connection of Arduino Board with ESP8266 Wi-Fi Module

- Arduino–ESP8266 interfacing
- AT command communication
- Wi-Fi connectivity

Experiment 10

Aim: IoT-Based Control of an LED using Arduino

- LED interfacing
- Digital output control
- Remote switching through Wi-Fi

Experiment 11

Aim: IoT and Cloud-Based Data Logger using LM35 and Arduino

- LM35 sensor interfacing
- Temperature monitoring
- Upload sensor data to an IoT cloud platform

Experiment 12

Aim: IoT-Based Home Automation using Arduino

- Relay interfacing
- Remote control of home appliances
- Basic home automation concepts

Experiment 13

Aim: IoT-Based Street Light Control

- LDR sensor interfacing
- Automatic light intensity control
- Energy-saving application

Experiment 14

Aim: IoT-Based DC Motor Speed Control

- PWM-based motor speed control
- Motor driver interfacing
- Remote monitoring/control using Wi-Fi

COs ↓ / POs → PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11

CO1	3	3	2	2	3	–	–	–	1	1	3
CO2	3	3	3	3	3	–	1	–	1	1	3
CO3	3	3	3	3	3	1	2	–	2	2	3
CO4	3	3	3	3	3	2	3	1	2	2	3
CO5	3	3	3	3	3	2	3	2	2	2	3

S.No	Experiment Title	Mapped POs
1	Installation of Python and IDE Setup	PO1, PO4, PO7, PO10, PO11
2	Programs using Variables, Data Types and Operators	PO1, PO2, PO3, PO10, PO11
3	Input–Output Operations	PO1, PO2, PO3, PO10, PO11
4	Simple Python Programs (Leap Year, Biggest Among Three Numbers, Number Reversal)	PO1, PO2, PO3, PO5, PO11
5	Programs using Conditional and Looping Statements	PO1, PO2, PO3, PO4, PO5, PO11
6	Modular Programming using Functions	PO1, PO2, PO3, PO4, PO9, PO11
7	Programs using Python Data Structures	PO1, PO2, PO3, PO4, PO11
8	File Handling	PO1, PO2, PO3, PO4, PO5, PO11
9	Connection of Arduino Board with ESP8266 Wi-Fi Module	PO1, PO2, PO3, PO4, PO5, PO9, PO11
10	IoT-Based Control of an LED using Arduino	PO1, PO2, PO3, PO4, PO5, PO9, PO11
11	IoT and Cloud-Based Data Logger using LM35 and Arduino	PO1, PO2, PO3, PO4, PO5, PO7, PO10, PO11
12	IoT-Based Home Automation using Arduino	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO11
13	IoT-Based Street Light Control using Arduino	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO11
14	IoT-Based DC Motor Speed Control using Arduino	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO11

BOARD DIPLOMA EXAMINATIONS(C-26)
Model Paper
Mid - I
C-26, CS-120: Fundamentals of Python Programming & IoT Lab

Time: 1 Hour

Total Marks: 20 MARKS

Instructions

1. Answer **ANY TWO** questions.
2. Each question carries **10 marks**.

Questions

1. Write a Python program to check whether a given year is a **Leap Year**.
2. Write a Python program to find the **Biggest among Three Numbers** entered by the user.
3. Write a Python program to **display the reverse of a given number**.
4. Write a Python program to **check whether a given number is an Armstrong Number**.
5. Write a Python program to **print the factorial of a given number using a user-defined function**.

BOARD DIPLOMA EXAMINATIONS(C-26)
Model Paper
Mid - II
C-26, CS-120: Fundamentals of Python Programming & IoT Lab

Time: 1 Hour

Total Marks: 20 MARKS

Instructions

1. Answer **ANY TWO** questions.
2. Each question carries **10 marks**.

Questions

1. Write a Python program to demonstrate the use of **Lists** by performing insertion, deletion, and display operations.
2. Write a Python program to **read data from a text file and display its contents**.
3. Interface the **Arduino Board with the ESP8266 Wi-Fi Module** and demonstrate Wi-Fi connectivity.
4. Develop an **IoT-Based LED Control** system using Arduino.
5. Develop an **IoT and Cloud-Based Data Logger** using the LM35 temperature sensor and Arduino.

BOARD DIPLOMA EXAMINATIONS(C-26)

SEE Model Paper

C-26, CS-120: Fundamentals of Python Programming & IoT Lab

Time: 2 Hour

Total Marks: 40 MARKS

Instructions

1. Answer **ANY TWO** questions.
2. Each question carries **20 marks**.

Questions

1. Write a Python program to check whether a given year is a **Leap Year**.
2. Write a Python program to print the **factorial of a given number using a user-defined function**.
3. Write a Python program to demonstrate the use of **Lists** by performing insertion, deletion, and display operations.
4. Write a Python program to **read data from a text file and display its contents**.
5. Interface the **Arduino Board with the ESP8266 Wi-Fi Module** and demonstrate Wi-Fi connectivity.
6. Develop an **IoT-Based LED Control** system using Arduino.
7. Develop an **IoT and Cloud-Based Data Logger** using the LM35 temperature sensor and Arduino.
8. Develop an **IoT-Based Home Automation** system using Arduino.
9. Develop an **IoT-Based Street Light Control** system using Arduino.
10. Develop an **IoT-Based DC Motor Speed Control** system using Arduino.