

*Suggested Teaching Guidelines for*  
**Programming Technologies**

***PG-DIOT, Sept 2022***

**Duration:** 60 hours of theory + 60 hours of lab

**Objective:** To become comfortable programming techniques and tools  
Coverage of syntax and applied concepts of C and Python

**Prerequisites:** Basic Linux Commands, Vi Editor, Simple C programming

<b>Evaluation method:</b>	Theory exam	- 40% weightage
	Lab exam/case study	- 40% weightage
	Internal exam	- 20% weightage

**List of Text Books / Other training material**

- C in Depth by Deepali Srivastava and S. K. Srivastava
- Introduction to Computer Science Using Python Charles Diebach

Reference Books:

- Head First C 1<sup>st</sup> Edition

**Note:** Each session is of 2 hours

**C & Data Structures**

**Session 1:**

- Introduction to C Standards
- Scope of C in IoT
- Programming Environment – Building Phases
- GNU Tool chain, tools for development, analysis
- Layout of a C program

**Session 2, 3:**

- Language Basics
- Internal representation of data types
- Qualifiers
- Operators
- Control Structures

**Session 4, 5:**

- Pointers & Arrays
- const, volatile keywords

**Session 6, 7:**

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- Functions
- Parameter Passing, Returning data
- Recursion
- Function Pointers
- Linkage Rules

**Session 8:**

- Strings
- Library functions
- Command Line Arguments

**Session 9, 10:**

- Structures & Unions
- Alignment, Packing Issues
- Bit Fields

**Session 11:**

- Dynamic Memory Management
- Detecting Memory Leaks, Heap analysis

**Session 12, 13:**

- Preprocessor
- Enumeration Types
- File Handling
- Self referential structures

**Session 14:**

- Linked Lists
- Stacks and Queues

**Session 15 and 16:**

- Searching Techniques

**Session 17 and 18:**

- Sorting Techniques

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**Python Programming**

**Session 19:**

- Introduction to Python
- Scope in IOT
- Setting up environment
- Console I/O Operations

**Session 20:**

- Data Types, Variables, Literals
- Operators
- Control Structures

**Session 21:**

- String handling
- List, Tuples, Dictionary.

**Session 22:**

- Sets
- Functions
- Lambda Functions

**Session 23:**

- File Handling
- Exception handling
- Regular expressions, pattern matching

**Session 24:**

- Modules
- Packages
- Building custom packages
- Standard Library
- Example library - OS Module

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**Session 25:**

- OOPs concept
- Class, object
- Constructors & Destructors
- Abstraction

**Session 26:**

- Inheritance
- Encapsulation
- Polymorphism

**Session 27:**

- Multi processing and Multi threading
- Working with Numpy

**Session 28:**

- Working with Pandas

**Session 29:**

- Working with matplotlib, seaborn

**Session 30:**

- Working with plotly

**Additional Topics:-**

- Evolving programming language like Haskell, Scala can be introduced.