

Course 204: Programming Skills

Course Code:	204
Course Title:	Programming Skills
Credit:	4
Nature of Subject:	Theory and Practical
Teaching per Week	4 Hours
Minimum weeks per Semester:	15 (Including Class work, examination, preparation etc.)
Review / Revision:	June, 2020
Purpose of Course:	Understand concepts of programming using Compiler based programming language C and Interpreter based programming Language Python. Python codes can be executed using any open source IDE. This is not IDE specific course.
Course Objective:	<ul style="list-style-type: none"> i) Advance programming skills using compiler based programming language C ii) Introduction of Interpreter based Programming language Python. iii) Enhancing basic programming skills using Interpreter based and Compiler based programming languages.
Pre-requisite:	Fundamental knowledge of computer programming using 'C' language. Knowledge of Python and Python IDE installation is recommended.
Course Outcome:	Students will be proficient working on conditional statements, iterative Statements and fundamentals of programming concepts using C and Python.
Course Content:	<p>UNIT-1: Arrays, Structure & Union and User defined function in C programming Language:</p> <p>1.1 Concepts of Two-Dimensional Numeric Array:</p> <p>1.1.1 Declaring Two-Dimensional numeric array</p> <p>1.1.2 Two-Dimensional numeric Array operations (Addition, Subtraction, Multiplication, Transpose)</p> <p>1.1.3 Element Address in array (Row major and Column major)</p> <p>1.1.4 Two-Dimensional Character Array:</p> <p>1.1.4.1 Declaring & Initializing Two-Dimensional character array</p> <p>1.1.4.2 Two-Dimensional character Array operations (Searching elements, copying, merging, finding length of given string)</p> <p>1.2 Concepts of structure and Union:</p> <p>1.2.1 Defining, declaring and Initializing structure and Union</p> <p>1.2.2 typedef and accessing structure member</p> <p>1.2.3 Difference between structure and union</p> <p>1.3 User defined functions :</p> <p>1.3.1 Function return type, parameter list, local function variables</p> <p>1.3.2 Passing arguments to function</p> <p>1.3.3 Calling function from main() function or from other function.</p> <p>1.3.4 Function with No arguments and no return value, No arguments and a return value, with arguments and no return value, with arguments and a return value.</p> <p>1.3.5 Recursive Function</p>

UNIT-2 : Python Fundamentals:

2.1 Concepts of Interpreter based programming language:

- 2.1.1 Structure of Python Programming language.
- 2.1.2 Python code Indention and execution

2.2 Python Variables:

- 2.2.1 Naming of variables and Dynamic declaration of variables
- 2.2.2 Comments in Python
- 2.2.3 Assigning values to multiple variables
- 2.2.4 Global variables

2.3 Python Datatypes:

- 2.3.1 Text (str), Numeric Type(int, float, complex), Boolean (bool)
- 2.3.2 Setting Datatypes
- 2.3.3 Type conversion (int, float, complex), casting (int, float, str)

2.4 User defined function .

- 2.4.1 Defining function, Function with Parameters
- 2.4.2 Parameter with default value, Function with return value

UNIT-3 : Python Strings and Operators

3.1 Python Strings :

- 3.1.1 Multiline string, String as character array, triple quotes
- 3.1.2 Slicing string, negative indexing, string length, concatenation
- 3.1.3 String Methods:(centre, count, join, len, max, min, replace, lower, upper, replace, split)

3.2 Operators :

- 3.2.1 Arithmetic Operators(+, -, *, /, %, **, //)
- 3.2.2 Assignment Operators(=, +=, -=, /=, *=, //=)
- 3.2.3 Comparison Operators (==, !=, >, <, >=, <=)
- 3.2.4 Logical Operators (and, or, not)
- 3.2.5 identity and member operators (is, is not, in, not in)

UNIT-4 : Python conditional and iterative statements :

4.1 if statement, if..elif statement, if..elif...else statements, nested if

4.2 Iterative statements :

- 4.2.1 while loop, nested while loop, break , continue statements.
- 4.2.2 for loop, range, break, continue, pass and Else with for loop, nested for loop.

4.3 List : creating list, indexing, accessing list members, range in list, List methods (append, clear, copy, count, index, insert, pop, remove, reverse, sort).

UNIT-5: Python Collections and Library :

5.1 Python Collections :

- 5.1.1 Tuples : Declaring tuple, indexing tuple, changing tuple values, adding and removing data from tuple, Use of tuple() method to create tuple, count() and index() methods.
- 5.1.2 Sets: declaring set, access set data, set methods (add, clear, copy, discard, pop, remove, union, update).

	<p>5.1.3 Dictionary :</p> <p>5.1.3.1 Creating Dictionary, Adding, Accessing and Removing element</p> <p>5.1.3.2 Dictionary methods : get(), pop(), popitem(), clear(), copy()</p> <p>5.2 Introduction to Numpy and Pandas :</p> <p>5.2.1 Overview of numpy</p> <p>5.2.1.1 Numpy methods (Mean, Median, Mode, Standard Deviation and Variance)</p> <p>5.2.1.2 Implementation of Numpy methods on numeric dataset created using list.</p> <p>5.2.2 Pandas Dataframe:</p> <p>5.2.2.1 Creating dataframe using list</p> <p>5.2.2.2 Creating dataframe using dict of equal length list</p> <p>5.2.2.3 Reading data using csv file (read_csv())</p> <p>5.2.2.4 Retrieving rows and columns from dataframe using index</p> <p>5.2.2.5 Retrieving rows and columns using loc and iloc functions.</p>
<p>References :</p>	<ol style="list-style-type: none"> 1. Programming in C, Balaguruswami - TMH 2. C Programming Language, Kernigham & Ritchie - TMH 3. The spirit of C, Cooper H & Mullish H - Jaico Pub. 4. Programming in C, Stephan Kochan - CBS 5. Mastering Turbo C, Kelly & Bootle - BPB 6. C Language Programming, Byron Gottfried –TMH 7. Learning Python -Mark Lutz : O'Reilly Media 8. Core Python Programming – by Wesley J Chun ISBN-13: 978- 0132269933 9. Python for Everybody: Exploring Data in Python 3, by Charles Severance (Author), Aimee Andrion (Illustrator), Elliott Hauser (Editor), Sue Blumenberg (Editor) 10. An Introduction to Python - by van Rossum Guido ISBN: 9780954161767, 0954161769 11. Core Python Application Programming – by Wesley J Chun Prentice Hall
<p>Teaching Methodology:</p>	<p>Class Work, Discussion, Self-Study, Seminars and/or Assignments</p>
<p>Evaluation Method:</p>	<p>30% Internal assessment. 70% External assessment.</p>