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MASTER OF SCIENCE – CYBER SECURITY AND CYBER LAW

- **Sem.** : 1
- **Subject Code** : 05CS3104
- **Subject** : Python Programming
- **Course Objectives** :

1. To provide understanding of Python fundamentals including data types, operators, control structures and functions.
2. To develop competency in applying object-oriented programming concepts in Python.
3. To enhance skills in modules, file handling and regular expressions for structured data processing.
4. To equip learners with the ability to handle data frames, visualization and database connectivity using Python.
5. To familiarize students with Python modules used in cyber security applications.

- **Prerequisites** : Basics of Programming

Unit No	Topics Covered	No of lectures required
1	**Introduction to Python** - Features, Writing first Python Program, data types, operators, Input Output statements, expressions, assignment, Using IDLE - Control statements - Arrays in Python - String Function	6

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2	**Mutable and Immutable Objects in Python** - List - Tuple - Dictionary **Functions in Python** - Defining and using function with returning values - Different types of arguments (Required arguments, Variable length Arguments and Keyword Arguments) **Class and Objects** - Basic structure of class in Python - Use of "self" - Constructor - Types of methods : class method, static methods and instance methods - Method overloading and Method overriding - Types of variables : Class variable and instance variable - Inner class	**6**

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3	**Inheritance** - Introduction - Types of Inheritance **Exception Handling** - Different types of exception in Python - Exception handling blocks (try, except, else and finally) **Modules in Python** - Creating module - Using module with "import module" and "from module import" i.e. various types of methods to import module **File handling** - Different types of file handling modes - Reading from files using read(), readline() and readlines() - Writing to files using write() and writelines() **Regular Expressions in Python** - Basics of regular expression - Use of match(), search(), findall() and sub()	**6**

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4	**Database Connectivity** - Different modules for database connectivity - Connecting, opening and closing database using connect(), open() and close() - Creating cursor for various operations using cursor() and its methods - Executing commands using execute() method - Insert records - Update records - Delete records - Fetching records using fetchone(), fetchmany() and fetchall() methods **Data Frame in Python** - Create data frames in different ways using csv files, list, dictionary **Data Visualization** - Understand different types of basic graphics - Line Graph, Bar Graph, Histogram Graph and Pie Graph	**6**
5	**Python for Cyber Security** - Using "whois" to get information about an IP address or domain name - Using "dig" to get information about an IP address or domain name - Using "re" to detect emails - Using "socket" for network communication - Using "hashlib" to create hash values - Using "os" to interact with the operating system	**6**

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Course Outcomes :

1. Apply Python programming fundamentals to solve computation and data handling problems.
2. Analyze and implement object-oriented programming features such as inheritance and exception handling for secure program flow.
3. Apply and analyze modules, file handling and regular expressions for text and data processing tasks.
4. Apply Python for data frame processing, visualization and database driven operations.
5. Evaluate and implement Python based cyber-security tasks such as hashing, network communication and OS interaction.

Text Book:

1. "Core Python Programming", R Nageswara Rao, Dreamtech Press, 2nd Edition
2. "Python for Cyber Security Cookbook", Nishant Krishna, BPB Publication, 2024

Reference Books:

3. "Introduction to Computation and Programming Using Python", John V Guttag, Prentice Hall of India, Second Edition
4. "Core Python Applications Programming", Wesley J Chun, Pearson, 3rd Edition
5. "Professional Python", Luke Sneeringer, WROX Publication, First Edition

Web References :

1. "Learn Python the Hard way", http://learnpythonthehardway.org/
2. Swaroop C H. "A Byte of Python", http://www.swaroopch.com/notes/python
3. Dive Into Python 3: http://www.diveintopython.net/
4. Python for Beginners :https://www.python.org/about/gettingstarted/

App References :

1. Learn Python
2. SoloLearn Python

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3. Python Pattern Programs Free
4. Python Programming App

Syllabus Coverage from text /reference book & web/app reference:

Unit #	Chapter Numbers
1	Text Book-1: 1, 2,3,4,5,6,7,8,9,10,11
2	Text Book-1: 13,14,16
3	Text Book-1: 9,17,18
4	Text Book-1: 24,25
5	Text Book-2: 2,5,10

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PRACTICALS

Unit No	List of Practicals
1	Python Program to Print Hello World.
	Python program to do arithmetical operations
	Python program to swap two variables
	Python Program to Find the Factorial of a Number
	Python Program to Print the Fibonacci sequence
	Python program to print the elements of an array
	Python program to print the largest element and smallest element in an array
	Python program to add two matrix using array and function
	Python Program to concatenate two strings
	Python Programs to perform various operations on Strings using functions
2	Python Programs to demonstrate use of list and various functions of it
	Python Programs to demonstrate use of tuple and various functions of it
	Python Programs to demonstrate the use of dictionary and various functions of it
	Python Programs to create a function (Make your own assumptions)
	Python Programs to demonstrate use of various arguments which can be passed to functions
	Python Program to demonstrate the use of class
	Python Program to demonstrate the concept of inner class
	Python program to demonstrate the use of methods
	Python program to demonstrate various types of methods
	Write a Python program to show method overloading by adding two numbers and three numbers using the same method name.
	Write a Python program to show method overriding using a parent class Animal and a child class Dog.
3	Write a Python program to show single inheritance using classes Animal and Dog.
	Python programs to demonstrate the use of various forms of inheritance

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	Write a Python program to handle division by zero using try and except.
	Write a Python program to handle invalid input entered by the user.
	Write a Python program to use try–except–else block.
	Write a Python program to use try–except–finally block.
	Python programs to demonstrate use of modules
	Python programs to demonstrate the use of file handling
	Python Programs to demonstrate the use of various modes of files.
	Python programs to demonstrate the use of regular expression
4	Write a Python program to connect Python with MySQL database and display a message "Database Connected Successfully".
	Write a Python program to create a table, insert records, retrieve and display records from a table.
	Write a Python program to update the records into a MySQL table and display records.
	Write a Python program to delete the records into a MySQL table and display records.
	Python Program to demonstrate the use of DataFrames in python
	Python Programs to demonstrate different ways of creating DataFrames
	Python Programs to create Pie chart
	Python Programs to create histogram
	Python Programs to create bar graph
	Python Programs to create Line graph
5	Write a Python program to perform a WHOIS lookup for a given domain name and display the result.
	Write a Python program to accept a domain name from the user and show basic WHOIS information.
	Write a Python program to display the domain registrar name using WHOIS.
	Write a Python program to display the domain creation date using WHOIS.

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	Write a Python program to use the dig command to find the IP address of a website (example: google.com). Also, display the DNS records of a given domain.
	Python Program using re — Detect Emails Using Regular Expressions
	Python Program using socket — Simple Port Scanner
	Program to generate hash values of a string using hashlib library.
	Python Program using os Library — Check Files in a Directory
	Python program for Ping Scanner shows ip up or down