

FACULTY OF COMPUTER APPLICATIONS

- **Course** : BCA
- **Sem.** : 6
- **Subject Code** : 05BC0602
- **Subject** : **Programming with Python (Overview of Python & Django)**
- **Objective** :
- **Prerequisites** : a. Shall have basic programming language understanding.
b. Preferably shall have gone through any of the programming language.

Unit No	Topics Covered	No of lectures required
1	<p>Understanding Python</p> <p>Basics of Python</p> <ul style="list-style-type: none"> ○ Features of Python ○ Installing Python ○ What is IDLE and its basics ○ Using IDLE's Python Shell Window ○ Python Built-in Data Types (Numbers, Lists, Tuples, Strings, Dictionaries, Sets, File Objects, etc.) ○ Indentation and Block Structuring ○ Differentiating Comments ○ Variables and assignments ○ The None value ○ Getting input from user ○ Built-in Operators ○ Control Flow (if-else-if, while, for loop, statement blocks, writing simple programs using all above) <p>Mutable and Immutable Objects</p> <ul style="list-style-type: none"> ○ Difference between Mutable and Immutable Objects ○ List (indices, Modifying, Sorting, Common List Operations, Nested Lists, Deep Copies) ○ Tuples (basics, packing-unpacking tuples, Common Tuple Operations, Conversion between List to Tuple and vice versa) 	17

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<p>2</p>	<p>Functions</p> <ul style="list-style-type: none"> ○ basics, positional parameters, passing arguments by parameter name, variable length arguments ○ Local, nonlocal and global variables ○ Assigning functions to variables ○ Lambda expressions / Lambda Functions <p>Modules</p> <ul style="list-style-type: none"> ○ Basics of modules ○ Import statement (different ways of importing module) ○ Module search path ○ Private names in modules ○ Library and third party modules ○ Python scoping rules and namespaces 	<p>8</p>
<p>3</p>	<p>File Handling</p> <ul style="list-style-type: none"> ○ Path and path names, absolute and relative path ○ Knowing current working directory, os.getcwd() ○ Manipulating path names ○ Useful constants and functions ○ Getting file information ○ Professing all files ○ Opening file and file objects, Closing files ○ Reading & writing files (with and without binary data) ○ Shelving objects ○ Small choice based project on File Handling <p>Exception Handling</p> <ul style="list-style-type: none"> ○ Introduction to exceptions ○ Types of exceptions ○ Raising exceptions, Catching & handling exceptions ○ Defining new exceptions ○ Assert in Exception handling ○ Exception inheritance hierarchy ○ Using with 	<p>9</p>
<p>4</p>	<p>Class and Object Oriented Programming</p> <ul style="list-style-type: none"> ○ Basics of Object Oriented Programming with features ○ Defining class ○ Instance variables, methods ○ Class variables, methods ○ Static methods and class methods ○ Private variables and methods ○ Inheritance 	<p>7</p>

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	<ul style="list-style-type: none"> ○ Scoping rules and namespaces for class instances ○ Destructors and memory management ○ Multiple inheritance ○ Operator overloading basics, overloading various operators in Python 	
5	<p>Introduction to Django</p> <ul style="list-style-type: none"> ○ Django Overview ○ Advantages of Django ○ Installing Django ○ Django Architecture ○ Creating and Setting up basic Application ○ Creating Simple View 	7
Total Hours		48

▪ **Course Outcomes**

1. Understand structure and execution mechanism of Python
2. Implement given algorithm as a program in Python
3. Adequately use structured programming constructs
4. Use library software and create the same
5. Understanding object oriented features and utilize the same in software development
6. Getting next step for exposure to advance applications such as Network programming, multithread programming, GUI and web applications
7. Understand basics of Django architecture

▪ **Main Reference :**

1. Core Python Programmning (Second Edition), Wesley J. Chun, Prentice Hall (ISBN : 0-13-226993-7)
2. Django Tutorial Points / Django Unleashed

▪ **Other References :**

1. Python Programming for Absolute Beginners, Michael Dawson, Premier Press (ISBN:1592000738)
2. Head First Python, Paul Berry, O'REILLY (ISBN : 978-1-449-38267-4)
3. The Quick Python Book, Vernon L. Ceder, Manning (ISBN : 9781935182207)
4. Django Tutorial Points / Django Unleashed

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Syllabus Unit	Reference Book Unit
1	1, 2, 3, 4, 5, 6, 7, 8
2	9, 10
3	12, 13, 14 (Small Choice Project on file handling shall be given as a small project to student for Add, Edit, Delete, View operations using files. Operations shall be done using List)
4	15 (Last topic operator overloading shall be taught separately as not in Main reference book)
5	Django Tutorial Points / Django Unleashed Chapter-1

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Tentative Practical List for Python (BCA)

1)	Write a simple Python Program to INPUT two variables and print Addition, Subtraction, Multiplication and Division of both numbers.
2)	Write a program to input 2 number and an arithmetic operator. Display the result accordingly.
3)	Write a program to input Principal Amount, Rate and Year and display Simple Interest.
4)	Write a program to input Principal Amount, Rate and Year and display Compound Interest
5)	Write a program to input radius of a circle, and print area of that circle.
6)	Write a program to input a number and print whether it is Even or Odd Number.
7)	Write a program to input age of person and display message as follows <ul style="list-style-type: none"> ▪ If age < 12 print You are Kid ▪ If age between 12 to 17 print You are teenager ▪ If age between 18 to 60 print you are Adult If age > 60 print You are Senior Citizen
8)	Write a Python Program to input marks of 4 subjects and display Total, Percentage, Result and Grade. If student is fail (<40) in any subject then Result should be displayed as "FAIL" and Grade should be displayed as "With Held**"
9)	Write a program to input a number and display Table of that number.
10)	Write a program to print all numbers which are divisible by 7 between 1 to 200.
11)	Write a program to input a number and display Factorial of that number. For example, Factorial of 5 = 5 * 4 * 3 * 2 * 1 = 120.
12)	Write a program to input a number and display whether number is prime or not.
13)	Write a program to print tables of 1 to 10.
14)	Write a program to input 10 numbers and display total and average of the same.
15)	Write a program to print pyramid as follows <pre> 1 1 2 1 2 3 1 2 3 4 1 2 3 4 5 1 2 2 3 3 3 4 4 4 4 5 5 5 5 5 1 0 0 1 1 1 0 0 0 0 1 1 1 1 1 </pre>

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	<pre> 1 1 0 1 0 1 1 0 1 0 1 0 1 0 1 </pre>
16)	<p>Write python program to create pyramid as follows</p> <pre> 1 1 A 2 3 0 1 A B 4 5 6 1 0 1 A B C 7 8 9 10 1 0 1 0 A B C D 11 12 13 14 15 1 0 1 0 1 A B C D E A A B A A B C B A A B C D C B A A B C D E D C B A </pre>
17)	<p>Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5, between 2000 and 3200 (both included).</p>
18)	<p>Write a program to print all prime numbers between 1 to 100.</p>
19)	<p>Write a program to print factorial number using function</p>
20)	<p>Write a program to create list in such a way that it should add square roots of number between 1 to n in the list... At the end, the list shall be displayed. Example : [1, 4, 9, 16, 25, ...]</p>
21)	<p>Write a program to create dictionary in such a way that it should add number as a key and square root of number as a value between 1 to n in the dictionary... At the end, the data shall be displayed. Example : {1:1, 2:4, 3:9, 4:16, 5:25, ...}</p>
22)	<p>Write a program which accepts a sequence of comma-separated numbers from console and generate a list and a tuple which contains every number.</p>
23)	<p>Write a Python Program to create a function which accepts 3 arguments. (2 numbers and one arithmetic operator). Display answer accordingly</p>
24)	<p>Write a Python Program to create function which accepts one argument as a number and return Factorial value of the number. (Function must be RECURSIVE function, not loop)</p>
25)	<p>Write a program to create lambda function to add two numbers and display total.</p>
26)	<p>Write a Python Program accept comma separated string and display tokens using split(), rsplit() and splitlines()</p>
27)	<p>Write a program which should have following choices 1) UP 2) DOWN 3) RIGHT</p>

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	<p>4) LEFT 5) EXIT</p> <p>Consider that you are at 0 point location. Identify the movements and at last print how many steps you are far from the original point. Suppose we press as follows UP – 5 times, Down – 3 Times, Left – 3 Times, Right – 2 Times. Now we are 3 steps far from the 0 point.</p>
28)	<p>Write a program which takes 2 digits, X,Y as input and generates a 2-dimensional array. The element value in the i-th row and j-th column of the array should be $i*j$. Note: $i=0,1.., X-1$; $j=0,1,iY-1$. Suppose the following inputs are given to the program: 3, 5 Then, the output of the program should be: $[[0, 0, 0, 0, 0], [0, 1, 2, 3, 4], [0, 2, 4, 6, 8]]$</p>
29)	<p>Write a program that accepts a comma separated sequence of words as input and prints the words in a comma-separated sequence after sorting them alphabetically. Suppose the following input is supplied to the program : without,hello,bag,world Then, the output should be : bag,hello,without,world</p>
30)	<p>Write a program that accepts sequence of lines as input and prints the lines after making all characters in the sentence capitalized. If you enter blank line, shall be treated as exit of program. All the upper case converted lines shall be added to list one by one</p>
31)	<p>Write a program to generate random password which shall combine upper case alphabets, lower case alphabets, digits and special characters. You shall prepare separate dictionary items called "lower", "upper", "digits", "special" and values shall be stored accordingly. From this array, based on the user's choice random password shall be generated. You shall make sure that atleast one character is selected from all specified choices. Use dictionary / list as applicable</p>
32)	<p>Write a program to input student details as (rollno, name, gender, email, mobile). Store details into list by using concatenation. Consider following input</p> <p>Roll No : 101 Name : Nilesh Advani Gender : M E-Mail : nileshadvani@gmail.com Mobile : 9824030232</p> <p>It shall be stored as "101 Nilesh Advani M nileshadvani@gmail.com 9824030232".</p>

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	Like this details shall be stored for more then one student and at last, report shall be printed in column format for output. You can create choice based menu program
33)	Write the same program as above and print the data based on the sorted list of rollno or name.
34)	Write a program to read names from keyboard and store into text file
35)	Write a program to read any text file line by line
36)	Write a program to read text file having number and display all numbers with total and average at the last. (Manually prepare a file having some numbers and then read it)
37)	<p>Write a program to compute the frequency of the words from the input. The output should output after sorting the key alphanumerically.</p> <p>Suppose the following input is supplied to the program: "Hello There this is Python. Python is good"</p> <p>Then output shall be as follows :</p> <p>Hello : 1 There : 1 This : 1 is : 2 Python : 2 Good : 1</p>
38)	Write a Python Program that creates a student class with appropriate members and functions to add student, display student, delete student and search student (Use lists or tuple or named tuple, whatever applicable)
39)	Write a Python Program that creates a Student class with various methods. Use setattr() and getattr() on class object
40)	Define a class which has at least two methods: getString: to get a string from console input printString: to print the string in upper case.
41)	Write a Python Program that creates a class with function overloading
42)	Write a Python Program that creates a class and inherit into another class (Base Class : Student with rollno, name, gender, age) (Derived Class : Course with coursename, duration, fee) Use appropriate functions for each class
43)	<p>Create a class with two numbers as attributes. Write a program to overload "+" and "-" operator and display result accordingly. For example</p> <p>A = MyClass(10, 20)</p>

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	<p>B = MyClass(5, 55) C = A + B (Answer in C shall be 15 and 75) (Addition of n1 and n2 attribute of each class)</p>
44)	<p>Write a Python program to overload <code>__str__</code> method of class and print class values in string format. You can do overloading as per your choice but shall be done through <code>__str__</code> method only.</p>
45)	<p>Create a Bank class with following attributes and methods. (Consider one object only) Attributes : <code>acct_no</code>, <code>acct_holder</code>, <code>acct_type</code>, <code>amount</code> Methods : <code>__init__</code>, <code>display()</code>, <code>withdraw()</code>, <code>deposit()</code></p> <p>Display simple operations with choice based program.</p>
46)	<p>Write a program that uses all parts of exception handling in python (<code>try</code>, <code>except</code>, <code>else</code>, <code>finally</code>)</p>
47)	<p>Create user defined exception class in python and display output accordingly.</p>
48)	<p>Create a Bank class with following attributes and methods. (Create array of objects for 10 bank accounts)</p> <p>Attributes : <code>acct_no</code>, <code>acct_holder</code>, <code>acct_type</code>, <code>amount</code> Methods : <code>__init__</code>, <code>display()</code>, <code>withdraw()</code>, <code>deposit()</code>, <code>transaction()</code></p> <p><code>Transaction()</code> function can transfer amount from one account to another account.</p>
49)	<p>Create the same program as above but all the details shall be stored in file rather than only array / object array. Shall be choice based program.</p>
50)	<p>Create a class of Student with following attributes (<code>rollno</code>, <code>name</code>, <code>course</code>, <code>gender</code>, <code>date of birth</code>)</p> <p>Class shall have following methods <code>addStudent()</code> <code>searchStudent()</code> <code>showList()</code> <code>modifyStudent()</code> <code>deleteStudent()</code> <code>sortedView()</code></p> <p>Prepare menu drive program with the data stored in file. Main menu shall have above choices and sorted view shall have further choice of sorting as <code>rollno</code>, <code>name</code>, <code>gender</code> and <code>date of birth</code> which shall display the data accordingly) (Use list to store the data as follows [[101 Nilesh MCA M 05/03/1975], [102 Yashwant ME M 10/10/1960], [103 Kenny MCA F 20/10/1980]]</p> <p>Data is separated by pipe sign</p>
51)	<p>Create a class of Library with following attributes</p>

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	<p>(title, author, publisher, edition, year of publication, price, type (reference or text book))</p> <p>Class shall have following methods addBook(), modifyBook(), deleteBook(), searcBook(), listBooks(), sortedView()</p> <p>Prepare menu drive program with the data stored in file. Main menu shall have above choices and sorted view shall have further choice of sorting as title, author, publisher, year of publication and price which shall display the data accordingly) (Use list to store the data as follows [[Core Python Programming Wesley Chun Premier Press 2 2005 550 Text], [Pythong Programming for Beginners Michael Premier Press 2 2015 660 Reference], [Head First Python Paul Berry O Reilly 4 2014 550 Reference]]</p> <p>Data is separated by pipe sign</p>
52)	<p>Create a class of Medicine with following attributes (product_no, medicine_name, manu_date, exp_date, company, stock, min_stock)</p> <p>Class shall have following methods addMedicine(), searchMedicine(), updateMedicine(), deleteMedicine(), reports()</p> <p>Prepare menu drive program with the data stored in file. Main menu shall have above choices and repor t section shall show further choice of reports as</p> <ol style="list-style-type: none"> 1) medicine name wise report 2) Manufacturing Date wise report 3) Expiry datewise report 4) Out of order report (where stock is less then min_stock) <p>You can store the data as per your choice in file. Can use dictionary or list as per choice</p>
53)	Create python application to create tic tac toe game.
54)	<p>Write a file handling program which shall store Name and BirthDate, it should have 3 choices as follows</p> <ol style="list-style-type: none"> 1) Add Birth Date 2) List All Details 3) Show Today's Birth Days 4) Exit

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	The moment you start the program, it shall first display list of persons who have got birthday today.
55)	Write choice based program to perform all student operations on "Student" table as follows 1) Add Student 2) Search Student 3) Update Student 4) Delete Student 5) List Student 6) Exit
56)	Create simple project in Django with "Hello World" page
57)	Create a simple login application using Django.
