CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
ITL203	PROGRAMMING AND SYSTEM UTILITIES LAB	PCC	0	0	3	2

Preamble: This laboratory course is meant for understanding the fundamental system utilities. The course is also aimed for understanding and practicing the programming language Python.

Prerequisite: PYTHON programming knowledge and Computer Fundamentals.

Course Outcomes: After the completion of the course the student will be able to

CO No.	Course Outcomes	Bloom's Category
CO 1	Develop readable* Python programs by making use of basic constructs- Decision controls, Looping controls, Lists, Tuple and Strings	Create
CO 2	Design modular Python programs using normal and recursive functions	Create
CO3	Design programs using Dictionaries and Files	Create
CO 4	Experiment with the basic Windows/ Linux administration & network configuration utilities	Apply
CO 5	Experiment with version control tools using git	Apply
readable* - readability of a program means the following: 1. Logic used is easy to follow 2. Standards to be followed for indentation and formatting 3. Meaningful names are given to variables 4. Concise comments are provided wherever needed		

Mapping of course outcomes with program outcomes

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	2	2	3	1	3	-	-	-	-	-	-	-
CO 2	2	3	3	3	3	-	-	-	-	-	-	-
CO 3	2	3	3	3	3	-	-	-	-	-	-	-
CO 4	2	2	1	2	1	-	-	-	-	-	-	-
CO 5	-	-	2	-	3	-	-	-	3	2	-	-

3/2/1: High/Medium/Low

Assessment Pattern

Mark distribution

Total Marks	**CIE**	**ESE**	**ESE Duration**
150	75	75	2.5 hours

Continuous Internal Evaluation Pattern:

Attendance	:	15 marks
Continuous Assessment	:	30 marks
Internal Test (Immediately before the second series test)	:	30 marks

End Semester Examination Pattern: The following guidelines should be followed regarding award of marks

(a) Preliminary work	: 15 Marks
(b) Implementing the work/Conducting the experiment	: 10 Marks
(c) Performance, result and inference (Usage of equipments and troubleshooting)	: 25 Marks
(d) Viva voce	: 20 marks
(e) Record	: 5 Marks

General instructions: Practical examination to be conducted immediately after the second series test covering entire syllabus given below. Evaluation is a serious process that is to be conducted under the equal responsibility of both the internal and external examiners. The number of candidates evaluated per day should not exceed 20. Students shall be allowed for the University examination only on submitting the duly certified record. The external examiner shall endorse the record.

Course Level Assessment Questions

Course Outcome 1 (CO1):

Develop a python program to

1. Print all prime numbers with in an interval
2. Search an element in a list
3. Input a list of n numbers. Calculate and display the average of numbers. Also display the square of each value in the list
4. Add two matrices.
5. Find the number of occurrences of a given substring in a string.
6. Count the number of vowels, consonants, words and question marks in a given string.

Course Outcome 2 (CO2):

Develop a python program to

1. Find the value of `nCr` using function.
2. Implements calculator with functions like add, subtract, multiply, divide, exponent etc.
3. Find factorial of a given number using recursion.
4. Find nth Fibonacci number using recursion.

Course Outcome 3 (CO3):

1. Develop a python program to create dictionary of phone numbers and names of n persons. Display the contents of the dictionary in alphabetical order of their names

2. Develop a Python program to implement the following scenario. A book shop details contains the Title of book and Number of copies of each title. As books are added to shop the number of copies in each should increase and as books are sold the number of copies in each should decrease.
3. Develop a python code to read a text file, copy the contents to another file after removing the blank lines.
4. Develop a python program to implement the following scenario. Given a file "`data.txt`" with three columns of data separated by spaces. Read it into 3 separate simple sequences.
5. Create a class student with attributes name, rollno and a method showData() for showing the details. Create two instances of the class and call the method for each instance. Develop a python program to implement the scenario.

Course Outcome 4 (CO4):

Perform the following operations:

1. Apply the use of ATTRIB windows command to change the attributes of a file.
2. Create a file **`xyz.txt`** and change the ownership of this file to some other user on your machine.
3. Create a file **`hello.txt`** and make it executable.
4. Create a new user account and home directory called "Duck" and Set the user account "Duck's" expiry date as 07 - 07 - 2020
5. Check the network connectivity of your computer using suitable Linux commands

Course Outcome 5 (CO5):

Perform the following:

1. Create a directory in your machine and make it as a repository and perform the following
   a. Create a text file and add some content into it.
   b. Add the file to the staging area of the Git repository.
   c. Commit the file to your repository.
   d. See the commit details using git log command.
2. Go to your Git repository and perform the following
   a. Do some modifications in your text file. Commit the changes.
   b. Try to revert to your old revision, again do some modifications in your text file and try to discard the changes.

List of Experiments

Part A : Programming in Python

1. **Basic programming experiments** to familiarization of data types and input-output statements
2. **Decision making, branching and looping statements**
3. **Function & Function calls**
   1. Function definitions and access
   2. Parameters and arguments
   3. Recursion
4. **Strings**
   a) String traversal, join, slicing
   b) String searching, Comparison

- c) Other important String methods

5. **Lists, Tuples and Dictionaries**
   - a) Creation of List & List Operations
   - b) Tuple and Tuple operations
   - c) Creation of Dictionary and Operations
   - d) Comparison of List and Tuple
6. **Matrix representation**
   - a) Creating matrix
   - b) Matrix operations - addition, subtraction and multiplication
7. **Files and Operations**
   - a) Files - defining, opening/closing, read/write operations
   - b) Exceptions in Python
   - c) Pickling
8. **Object Oriented Programming using Python**
   - c) Creation of Classes & Instances, method calling
   - d) Constructor & Destructor concepts
   - e) Implementation of Inheritance

Part B : System Utilities

Basic Windows/Linux Administration Utilities

1. **Experiments on Windows Operating System**

   a. Perform the following commands

   ```
   DIR, TYPE, DEL, ERASE, MD, CD, COPYCON, RMDIR, REN,
   VER, DATE, TIME, TREE, PATH, CLS, RMDIR, BREAK, SET,
   EXIT, APPEND, CHKDISK, ATTRIB, SYS, EDIT, XCOPY,
   DISKCOPY
   ```

   b. Explore and describe some system utility like **`regedit`**, memory partioning, control panel and window tools

2. **Experiments on Linux Operating System**

   a) Perform general purpose utilities in Linux:

   ```
   echo, uname, whoami, passwd, date, date +%T, date
   +%h, date +%m, date +%y, date +”%h%y”, cal, cal 12
   2030, echo $HOME, pwd, ls, ls –all, ls –l, cat, cat
   > file1, cat >> file2, ls -l >fileinfo
   ```

   b) Familiarize working with files and managing file attributes

3. **Network Configuration Utilities**

   a) **`ifconfig`** utility, enable/disable network interface, **`traceroute`**, **`telnet`**, **`nslookup`, `netstat`, `w`, `scp`**, etc

   b) Connecting to the internet

4. **GIT for version control**
    a. Installation and configuration of Git on Ubuntu and Windows operating systems
    b. Perform Basic Git Commands (**`gitinit, add, status, commit`**, and **`log`**) and Git **`checkout`** command

Text Books

1. Allen Downey, Jeffrey Elkner, Chris Meyers, " How to think like a Computer Scientist-Learning with Python", Green Tea Press, First edition, 2002.
2. Mark Lutz,"Learning Python: Powerful Object-Oriented Programming" , O'Reilly Media Inc.,5th,2013

Reference

1. S.A.Kulkarni, "Problem Solving and PYTHON Programming", 2nd edition, Yes Dee Publishing Pvt Ltd, 2018
2. Kenneth A. Lambert, B. L. Juneja, "Fundamentals of Python", Cengage Learning India Pvt. Ltd., 2015.
3. Mark Summerfield," Programming in Python 3: A Complete Introduction to the Python Language", Pearson Education, 2nd,2018
5. Yashavant Kanetkar ,Aditya Kanetkar ,"Let Us Python ",BPB Publications, 1st Edition, 2019
6. Allen Downey, "Learning with Python", Dreamtec Press, 1st Edition, 2015
7. https://docs.python.org/3/reference/
8. Version Control with Git: Powerful tools and techniques for collaborative software development 2nd Edition, Kindle Edition by Jon Loeliger, Matthew McCullough
9. https://spoken-tutorial.org/