APPLICATION DEVELOPMENT USING PYTHON
[(Effective from the academic year 2018 -2019)
SEMESTER – V

Course Code	18CS55	IA Marks	40
Number of Lecture Hours/Week	03	Exam Marks	60
Total Number of Lecture Hours	40	Exam Hours	03

CREDITS – 03

Course Objectives: This course (18CS55) will enable students to

- Learn the syntax and semantics of Python programming language.
- Illustrate the process of structuring the data using lists, tuples and dictionaries.
- Demonstrate the use of built-in functions to navigate the file system.
- Implement the Object Oriented Programming concepts in Python.
- Appraise the need for working with various documents like Excel, PDF, Word and Others.

Module – 1	Teaching Hours
Python Basics, Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program,**Flow control,** Boolean Values, Comparison Operators, Boolean Operators,Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules,Ending a Program Early with sys.exit(), **Functions,** def Statements with Parameters, Return Values and return Statements,The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling, A Short Program: Guess the Number **Textbook 1: Chapters 1 – 3** **RBT: L1, L2**	08
Module – 2	
Lists, The List Data Type, Working with Lists, Augmented Assignment Operators, Methods, Example Program: Magic 8 Ball with a List, List-like Types: Strings and Tuples,References, **Dictionaries and Structuring Data,** The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things, **Manipulating Strings,** Working with Strings, Useful String Methods, Project: Password Locker, Project: Adding Bullets to Wiki Markup **Textbook 1: Chapters 4 – 6** **RBT: L1, L2, L3**	08
Module – 3	
Pattern Matching with Regular Expressions, Finding Patterns of Text Without Regular Expressions, Finding Patterns of Text with Regular Expressions,More Pattern Matching with Regular Expressions, Greedy and Nongreedy Matching, The findall() Method, Character Classes, Making Your Own Character Classes, The Caret	08

and Dollar Sign Characters, The Wildcard Character, Review of Regex Symbols, Case-Insensitive Matching, Substituting Strings with the sub() Method, Managing Complex Regexes, Combining re .IGNORECASE, re .DOTALL, and re .VERBOSE, Project: Phone Number and Email Address Extractor, **Reading and Writing Files,** Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module,Saving Variables with the pprint.pformat() Function, Project: Generating Random Quiz Files, Project: Multiclipboard, **Organizing Files,** The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module, Project: Renaming Files with American-Style Dates to European-Style Dates,Project: Backing Up a Folder into a ZIP File, **Debugging,** Raising Exceptions, Getting the Traceback as a String, Assertions, Logging, IDLE's Debugger.

Textbook 1: Chapters 7 – 10

RBT: L1, L2, L3

Module – 4	
Classes and objects, Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying, **Classes and functions,** Time, Pure functions, Modifiers, Prototyping versus planning, **Classes and methods,** Object-oriented features, Printing objects, Another example, A more complicated example,The init method, The __str__ method, Operator overloading, Type-based dispatch, Polymorphism, Interface and implementation,**Inheritance,** Card objects, Class attributes, Comparing cards, Decks, Printing the deck, Add, remove, shuffle and sort, Inheritance, Class diagrams, Data encapsulation **Textbook 2: Chapters 15 – 18** **RBT: L1, L2, L3**	08
Module – 5	
Web Scraping, Project: MAPIT.PY with the webbrowser Module, Downloading Files from the Web with the requests Module, Saving Downloaded Files to the Hard Drive, HTML, Parsing HTML with the BeautifulSoup Module, Project: "I'm Feeling Lucky" Google Search,Project: Downloading All XKCD Comics, Controlling the Browser with the selenium Module, **Working with Excel Spreadsheets,** Excel Documents, Installing the openpyxl Module, Reading Excel Documents, Project: Reading Data from a Spreadsheet, Writing Excel Documents, Project: Updating a Spreadsheet, Setting the Font Style of Cells, Font Objects, Formulas, Adjusting Rows and Columns, Charts, **Working with PDF and Word Documents,** PDF Documents, Project: Combining Select Pages from Many PDFs, Word Documents, **Working with CSV files and JSON data,** The csv Module, Project: Removing the Header from CSV Files, JSON and APIs, The json Module, Project: Fetching Current Weather Data	08

Textbook 1: Chapters 11 – 14 **RBT: L1, L2, L3**	

Course Outcomes: After studying this course, students will be able to

- Demonstrate proficiency in handling of loops and creation of functions.
- Identify the methods to create and manipulate lists, tuples and dictionaries.
- Discover the commonly used operations involving regular expressions and file system.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Determine the need for scraping websites and working with CSV, JSON and other file formats.

Question paper pattern:

- The question paper will have ten questions.
- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Al Sweigart,**"Automate the Boring Stuff with Python",**1stEdition, No Starch Press, 2015. (Available under CC-BY-NC-SA license at https://automatetheboringstuff.com/) (Chapters 1 to 18)
2. Allen B. Downey, **"Think Python: How to Think Like a Computer Scientist",** 2nd Edition, Green Tea Press, 2015. (Available under CC-BY-NC license at http://greenteapress.com/thinkpython2/thinkpython2.pdf) (Chapters 13, 15, 16, 17, 18) (Download pdf/html files from the above links)

Reference Books:

1. Gowrishankar S, Veena A, **"Introduction to Python Programming",** 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372
2. Jake VanderPlas, **"Python Data Science Handbook: Essential Tools for Working with Data",** 1st Edition, O'Reilly Media, 2016. ISBN-13: 978-1491912058
3. Charles Dierbach, **"Introduction to Computer Science Using Python",** 1st Edition, Wiley India Pvt Ltd, 2015. ISBN-13: 978-8126556014
4. Wesley J Chun, **"Core Python Applications Programming",** 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365