

**SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES**

**SAVEETHA SCHOOL OF ENGINEERING**

**SESSION PLAN**

**BRANCH :** Computer Science and Engineering

**YEAR/SEM :** I

**SUB CODE & Name** : CS018 - PYTHON PROGRAMMING - Networking

**Faculty Name : Dr. T. Ruso**

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| **SESSION** | **TOPIC** | **ACTIVITY NAME** | **ACTIVITY DESCRIPTION** | **REFERENCE** |
| **UNIT 1** | **INTRODUCTION, DATA, EXPRESSIONS, STATEMENTS** | | | |
| Session 1 | Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; | Predicting the output | Students will be given questions to predict the output on various data types. For Questions refer Activity 1.1 | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| Debugging | Students will be asked to debug the errors on Lists. For questions refer Activity 1.2 | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| Session 2 | variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, | Finding missing code | Students will be given the programs and asked to fill the missing code on variables,expressions,tuple,precedence of operators,etc. For questions refer Activity 2.1 | Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011. |
| Session 3 | Programming Practice on Data Types, Expressions and Operators(Lab - 1) | 1. Area of Circle 2. Find average of three numbers 3. Compute power of a given number | | |
| Session 4 | function definition and use, flow of execution, parameters and arguments; algorithmic problem solving | Predicting the Output | Students will be asked to predict the output for the given program on functions. For questions refer Activity 4.1 | Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011. |
| Session 5 | Illustrative programs: exchange the values of two variables, | Finding the missing code | Students will be given the program and asked to fill the missing code. For questions refer Activity 5.1 | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| Session 6 | circulate the values of n variables, distance between two points. | Finding the missing code | Students will be given the program and asked to fill the missing code. For questions refer Activity 6.1 | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| Session 7 | Programming Practice on Modules and Functions(Lab - 1) | 1. Compute GCD of a number 2. Find the square root of a number (Newton’s method) 3. Prime number | | |
| UNIT 2 | **PROGRAMMING WITH PYTHON** | | |  |
| Session 6 | The NumPy Library - Basic Operations - Indexing, Slicing, and Iterating - Conditions and Boolean Arrays - | Problem based learning | Array Manipulation  Sort, search, counting functions | <https://www.tutorialspoint.com/numpy/> |
| Session 7 | Structured Arrays. | Game based learning | String Functions, Mathematical function, Arithmetic operations, Statistical functions, Matrix library, Linear algebra, Matplotlib, Histogram using Matplot | https://docs.scipy.org/doc/numpy-1.13.0/user/basics.rec.html |
| Session 8 | Pandas: The Python Data Analysis Library – Installation - | Scale up | The sum of an empty or all-*NA* Series is now 0  The product of an empty or all-*NA* Series is now 1  We’ve added a min\_count parameter to .sum() and .prod() controlling the minimum number of valid values for the result to be valid. If fewer than min\_count non-*NA* values are present, the result is *NA*. The default is 0. To return NaN, the 0.21 behavior, use min\_count=1. | https://pandas.pydata.org/ |
| Session 9 | Introduction to pandas Data Structures - Function Application and Mapping. | Pogil | Fast and efficient DataFrame object with default and customized indexing.  Tools for loading data into in-memory data objects from different file formats.  Data alignment and integrated handling of missing data.  Reshaping and pivoting of date sets.  Label-based slicing, indexing and subsetting of large data sets.  Columns from a data structure can be deleted or inserted.  Group by data for aggregation and transformations.  High performance merging and joining of data.  Time Series functionality. | <https://www.tutorialspoint.com/python_pandas/python_pandas_introduction.htm> |
| Session 10 | Pandas: Reading and Writing Data. | Critical Pedagogy | How To Create a Pandas DataFrameHow To Select an Index or Column From a DataFrame  How To Add an Index, Row or Column to a DataFrame  How To Delete Indices, Rows or Columns From a DataFrame  How To Rename the Columns or Indices of a DataFrame  How To Format the Data in Your DataFrame  How To Create an Empty DataFrame  Does Pandas Recognize Dates When Importing Data?  When, Why and How You Should Reshape Your DataFrame  How To Iterate Over a DataFrame  [How To Write a DataFrame to a File](https://www.datacamp.com/community/tutorials/pandas-tutorial-dataframe-python#question11) | https://www.datacamp.com/community/tutorials/pandas-tutorial-dataframe-python |
| UNIT 3 |  |  |  |  |
| Session 11 | Lists: operations, slices, methods, loop, mutability, aliasing, cloning, parameters | Concept Mapping | Students will be given sample input and output and asked to map the type of operations that has been performed on the Input to get the sample output. | Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011. |
| Session 12 | Tuples: tuple assignment, tuple as return value. | Pogil | Students will be given programs and asked to identify solutions for it | Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011. |
| Session 13 | Dictionaries: operations and methods | Scale Up | Each group will discuss on the importance of “ Dictionaries” and the different types of operations and methods available in it and are asked to explain each concept with examples | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| Session 14 | Advanced list processing, List comprehension | Scale Up | Each group will discuss on the importance of “ Advanced list processing, List comprehension” and the different types of operations and methods available in it and are asked to explain each concept with examples | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| Session 15 | Selection sort, insertion sort, merge sort, histogram. | Game based learning | Students are given game based puzzles related to  Insertion sort, merge sort, histogram and are asked to solve them. | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| UNIT 4 | **FILES, MODULES, PACKAGES** | | |  |
| Session 16 | Files and exception: text files, reading and writing files | Scale up | Write a function called sed that takes as arguments a pattern string, a replacement  string, and two filenames; it should read the first file and write the contents into the second file  (creating it if necessary). If the pattern string appears anywhere in the file, it should be replaced  with the replacement string.  If an error occurs while opening, reading, writing or closing files, your program should catch the  exception, print an error message, and exit. | 1. Robert Sedgewick, Kevin Wayne, Robert Dondero, ―Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016. |
| Session 17 | format operator; command line arguments | Problem based learning | Create a student database in a file using format operator. Get the file name as command line argument. | 1. Robert Sedgewick, Kevin Wayne, Robert Dondero, ―Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016 |
| Session 18 | errors and exceptions, handling exceptions | Critical Pedagogy | Students will be given programs with syntax errors and asked to identify the errors and how to handle the exceptions. | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| Session 19 | modules, packages | Game based Learning | Design an module for the following problem:  i) fibonacci series  ii) Prime number  iii) finding the square root of number | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| Session 20 | Illustrative programs: word count, copy file. | JIGSAW | Students should form as 5 groups and discuss the implemented program “word count, copy file” | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| UNIT 5 | **PYTHON TO CONTROL AND DOCUMENTING DATA SCIENCE PROCESSES** | | |  |
| Session 21 | Data types and objects, loading packages, namespaces, | Pogil | Different data types and Packa-ges | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| Session 22 | Reading and writing data, Simple plotting, Control flow, Debugging, Code profiling, | Problem based learning | Students will be given a realtime dataset and plot value and show graphs | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| Session 23 | Acquiring Data with Python: Loading from CSV files, Accessing SQL databases, | Problem based learning | Students will be given a realtime dataset and ask them to load dataset CSVfile and access database | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| Session 24 | Cleansing Data with Python: Stripping out extraneous information | Pogil | Students has to perform Cleansing and Stripping out data | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |
| Session 25 | Normalizing data, Formatting data | Critical Pedagogy | Students will be given programs based on variables,expressions,tuple,precedence of operators,etc and asked them to identify errors and solve the program | Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 ([http://greenteapress.com/wp/think- python/)](http://greenteapress.com/wp/think-python/) |