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| B TECH FIRST YEAR (COMMON COURSE) | | |
| **Course code** |  | L T P |
| **Course title** | **Problem solving using Python- I** | 2 1 0 |
| **Course objective:** | | |
| 1 | To learn basic building blocks of Python programming | |
| 2 | To acquire the skills to design algorithms for problem solving | |
| 3 | To impart the knowledge of implementation and debugging of basic programs in Python | |
| 4 | To disseminate the knowledge of basic data structures | |
| 5 | To provide the knowledge of file system concepts and its application in data handling | |
| **Pre-requisites:** Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts. | | |
| **Course Contents / Syllabus** | | |
| **UNIT-I** | **Basics of python programming** | **8 hours** |
| Introduction: Introduction to computer system, algorithms, Ethics and IT policy in company, Feature of object-oriented programming, A Brief History of Python, Applications areas of python, The Programming Cycle for Python, Python IDE, Interacting with Python Programs.  Elements of Python: keywords and identifiers, variables, data types and type conversion, operators in python, expressions in python, strings. | | |
| **UNIT-II** | **Decision Control Statements** | **8 hours** |
| Conditionals: Conditional statement in Python (if-else statement, its working and execution),  Nested-if statement and elif statement in Python, Expression Evaluation & Float Representation.  Loops: Purpose and working of loops, while loop, For Loop, Nested Loops, Break and Continue, pass statement. | | |
| **UNIT-III** | **Function and Modules** | **8 hours** |
| Introduction of Function, calling a function, Function arguments, built in function, scope rules, Passing function to a function, recursion, Lambda functions  Modules and Packages: Importing Modules, writing own modules, Standard library modules, dir ( ) Function, Packages in Python | | |
| **UNIT-IV** | **Basic Data structures in Python** | **8 hours** |
| Strings: Basic operations, Indexing and Slicing of Strings, Comparing strings, Regular expressions.  Python Basic Data Structure: Sequence, Unpacking Sequences, Mutable Sequences, Lists, List Comprehension, Looping in lists, Tuples, Sets, Dictionaries | | |
| **UNIT-V** | **File and Exception handling** | **8 hours** |
| Files and Directories: Introduction to File Handling in Python, Reading and Writing files, Additional file methods, Working with Directories.  Exception Handling, Errors, Run Time Errors, Handling IO Exception, Try-except statement, Raise, Assert  Searching & Sorting: Simple search & Binary search, Selection Sort, Merge Sort | | |
| **Course outcome: At the end of course, the student will be able to** | | |
| CO 1 | Write simple python programs. | K2, K3 |
| CO 2 | Develop python programs using decision control statements | K3, K6 |
| CO 3 | Implement user defined functions and modules in python | K2 |
| CO 4 | Implement python data structures – lists, tuples, set, dictionaries | K3 |
| CO 5 | Perform input/output operations with files in python and implement searching, sorting and merging algorithms | K3, K4 |
| **Text books** | | |
| (1) Magnus Lie Hetland, "Beginning Python-From Novice to Professional"—Third Edition, Apress | | |
| (2) Python Programming using Problem solving approach by Reema Thareja OXFORD  Higher education | | |
| (3) Kenneth A. Lambert, ―Fundamentals of Python: First Programs, CENGAGE Learning, 2012. | | |
| **Reference Books** | | |
| (1) John V Guttag, ―Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013 | | |
| (2) Charles Dierbach, ―Introduction to Computer Science using Python: A Computational Problem Solving Focus, Wiley India Edition, 2013. | | |
| (3) Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 | | |
| (4) Robert Sedgewick, Kevin Wayne, Robert Dondero: Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd.,2016. | | |
| (5) Timothy A. Budd, ―Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd.,2015. | | |
| (6) Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011. | | |
| **E-book and E-Content** | | |
| (1) https://www.pdfdrive.com/hacking-hacking-practical-guide-for-beginners-hacking-with-pythn-e182434771.html | | |
| (2) https://www.pdfdrive.com/python-programming-python-programming-for-beginners- python-programming-for-intermediates-e180663309.html | | |
| (3)https://www.pdfdrive.com/python-algorithms-mastering-basic-algorithms-in-the-python-language-e175246184.html | | |
| (4) https://www.pdfdrive.com/python-algorithms-mastering-basic-algorithms-in-the-python-language-e160968277.html | | |
| (5) <https://docs.python.org/3/library/index.html> | | |
| (6) https://www.w3schools.com/python/ | | |
| (7) https://www.py4e.com/materials | | |
| **Reference Links** | | |
| Unit-1 https://nptel.ac.in/courses/106/106/106106182/ | | |
| Unit-2 [https://nptel.ac.in/courses/106/106/106106212/](https://nptel.ac.in/courses/106/106/106106145/) | | |
| Unit-3 https://nptel.ac.in/courses/106/106/106106145/ | | |
| Unit-4 - https://nptel.ac.in/courses/106/106/106106145/ | | |
| Unit-5 - https://nptel.ac.in/courses/106/106/106106145/ | | |
| [Unit-2]- https://www.youtube.com/watch?v=PqFKRqpHrjw | | |
| [Unit – 3]- <https://www.youtube.com/watch?v=m9n2f9lhtrw>  https://www.youtube.com/watch?v=oSPMmeaiQ68 | | |
| [Unit 4]- https://www.youtube.com/watch?v=ixEeeNjjOJ0&t=4s | | |
| [Unit-5]- https://www.youtube.com/watch?v=NMTEjQ8-AJM | | |
| After Completing Course Student may get certification in python using following links:  Link for Certification:  <https://swayam.gov.in/nd1_noc19_cs41/preview>  https://aktu.ict.iitk.ac.in/courses/python-programming-a-practical-approach/ | | |