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LESSON PLAN

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| Course: MCA-106 – Python Programming | |
| MCA – 2nd Semester | No. of Theory Hours per Week: 04 |

Course Outcomes (COs):

| CO # | Detailed Statement of the CO |
|------|---|
| CO1 | Demonstrate knowledge of basic programming constructs in python. (BTL2) |
| CO2 | Illustrate string handling methods and user defined functions in python. (BTL2) |
| CO3 | Apply data structure primitives like lists, tuples, sets and dictionaries. (BTL3) |
| CO4 | Inspect file handling and object- oriented programming techniques. (BTL4) |
| CO5 | Evaluate and visualize the data using appropriate python libraries. (BTL5) |
| CO6 | Develop python applications with database connectivity operations. (BTL6) |

Recommended Books:

| Books | S. No. | Details of the Books |
|------------------------|--------|---|
| Text Books | 1. | Budd T A, “Exploring Python”, McGraw-Hill Education, 1st Edition, 2011. [TB1] |
| | 2. | Mark Lutz, “Learning Python”, O’Reilly, 4th Edition, 2013. [TB2] |
| | 3. | Y. Daniel Liang, “Introduction to Programming Using Python”, Pearson, 1st Edition, 2013. [TB3] |
| Reference Books | 1. | Kenneth A. Lambert, “The Fundamentals of Python: First Programs”, Cengage Learning, 1st Edition, 2011. [RB1] |
| | 2. | Allen Downey, “Think Python: How to Think Like a Computer Scientist”, O’Reilly, 2nd Edition, 2015. [RB2] |
| | 3. | Reema Thareja, “Python Programming using Problem Solving Approach”, Oxford University Press, 1st Edition, 2017. [RB3] |
| | 4. | Joel Grus, “Data Science from Scratch”, O’Reilly, 2nd Edition, 2019.. [RB4] |
| | 5. | Tony Gaddis, “Starting out with Python”, Pearson, 3rd Edition, 2014. [RB4] |

Lesson Plan for Theory:

| Lecture No. | Topics/Concepts to be Covered | Reference of the Book and its Chapter |
|------------------|--|---|
| UNIT - I | | |
| 1. | History, Features and Future of Python, Installation, Interactive Shell, Program Structure, Identifiers, Keywords, Escape Sequences, Data-Types, Variables | TB1 [Chapter 5]; TB3 [Chapters 1-6, 15] |
| 2. | Assignments, Immutable Variables, Operators and Operands, Precedence of Operators, Type-Conversion Functions | |
| 3. | Short-circuit vs. Lazy Evaluation, Input and Output Functions, Comments, Command-Line arguments. | |
| 4. | Control Flow | |
| 5. | Control Flow | |
| 6. | Defining, Calling and Types of Functions, Arguments and Return Values, Formal vs. Actual Arguments, Scope and Lifetime | |
| 7. | Keyword Arguments, Default Arguments, Decorators, Iterators and Generators, Recursion | |
| 8. | Importing Modules, Math | |
| 9. | Random Module | |
| 10. | Packages | |
| 11. | Composition | |
| UNIT – II | | |
| 12. | Basic functions of Strings, Subscript Operator | TB2 [Chapters 5, 18]; TB3[Chapters 3, 10, 11, 13, 14] |
| 13. | Indexing, Slicing and Immutable Strings | |
| 14. | Lists, Tuples, and Dictionaries, Basic List Operations, List Slicing | |
| 15. | List Methods, Cloning Lists, Mutability, Searching and Sorting Lists | |
| 16. | Tuples: Tuple Assignment, Tuple as Return Value | |
| 17. | Dictionary Literals, Adding and Removing Items, Accessing and Replacing Values, Traversing Dictionaries, Sorting Dictionaries | |
| 18. | Dictionary Operations, Sets | |
| 19. | Text Files-Writing and Reading Operations | |
| 20. | Creating and Reading a Formatted File | |
| 21. | Manipulating Files and Directories | |
| 22. | Closing Files | |

| Lecture No. | Topics/Concepts to be Covered | Reference of the Book and its Chapter |
|--------------------|---|--|
| UNIT – III | | |
| 23. | Classes, Objects, Attributes and Methods | TB3 [Chapters 7, 8, 12,13] |
| 24. | Access Specifiers, Constructors | |
| 25. | Static Methods, Data Hiding | |
| 26. | Inheritance, Polymorphism | |
| 27. | Operator Overloading, Abstract Classes. | |
| 28. | Multi-Threading, Life-Cycle of a Thread | |
| 29. | Synchronization using Locks and Semaphores. | |
| 30. | Exception Class Hierarchy | |
| 31. | Except clause, Try, Finally clause | |
| 32. | User-Defined Exception | |
| 33. | Assertions | |
| UNIT - IV | | |
| 34. | Advanced Python | TB1 [Chapters 11-12]; TB3 [Chapters 9, 16-23] |
| 35. | NumPy Library | |
| 36. | NumPy Library | |
| 37. | Pandas Library | |
| 38. | Pandas Library | |
| 39. | Data Visualization | |
| 40. | GUI Programming | |
| 41. | Database Access | |
| 42. | Database Access | |

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| Course: MCA-166 – Python Programming Lab. | |
| MCA – 2nd Semester | No. of Practical Hours per Week: 02 |

Course/Lab Outcomes (COs):

| COs for Practical (MCA-162) | |
|------------------------------------|---|
| CO1 | Demonstrate program creation in Python through usage of appropriate constructs and OOPs concepts. (BTL2) |
| CO2 | Apply the concepts of data structures and string functions in python program. (BTL3) |
| CO3 | Apply the concepts of file handling and exception handling. (BTL3) |
| CO4 | Evaluate and visualize the data using appropriate python libraries. (BTL5) |
| CO5 | Develop GUI based applications with database connectivity in Python. (BTL6) |

Lesson Plan for Practical:

| Week No. | Lab No. | Topics/Concepts to be Covered | Reference of Lab Manual |
|-----------------|----------------|--------------------------------------|--------------------------------|
| 1. | 1. | Basics of Python | P1-P4, P10 |
| 2. | 2. | Functions in Python | P4, P5, P14 |
| 3. | 3. | Concept of Recursion | P6, P9 |
| 4. | 4. | Concept of tuple and list | P7, P18, P19 |
| 5. | 5. | Dictionary problems | P8 |
| 6. | 6. | Concept of Strings | P11 |
| 7. | 7. | Use of in-built function and class | P12, P13 |
| 8. | 8. | Blend of recursion and strings | P17 |
| 9. | 9. | Concept of files | P15, P16 |
| 10. | 10. | Matplotlib library | P21 |
| 11. | 11. | Creating GUI using Python | P22 |
| 12. | 12. | Revision of all concepts | - |

Testing Schedule:

| Nature of Test | February | March | April | May |
|--------------------------------|--|----------------------------|----------------------------|-------------------------------|
| Surprise Test (ST) | ST in 3 rd week | ST in 2 nd week | - | - |
| Mid Term Test (MT) | - | | MT in 1 st week | - |
| Class Test (CT) | CT in 4 th week | | - | - |
| Supplementary Test (Sp. T) | - | - | - | Sp. T in 3 rd week |
| Assignment Submission Schedule | Assignment-1 is to be submitted One Week after completion of Unit-1 and Unit-2. Assignment-2 is to be submitted One Week after completion of Unit-3. Assignment-3 is to be submitted One Week after completion of Unit-4. | | | |