Brief Content

1. Python Basics
2. Introduction of Object-Oriented Programming
3. Classes and Objects
4. Composition
5. Encapsulation
6. Polymorphism
7. Enumeration
8. Inheritance
9. Abstraction
10. Introduction to GUI programming with tkinter
11. Data Structures and Algorithms
12. Networked programs
13. Django and Web Services
14. Using Databases and SQL
15. Data Libraries
16. Week 2 : Variadic Functions
17. Week 3 : Decorators
18. Week 3 : Comparing and Copying Objects
19. Week 3 : Abstract Classes and Metaprogramming
20. Week 4 : Modularization and Classes
21. Week 4 : Object oriented design
22. Week 4 : Exceptions and data structures
23. Week 5: Student final project presentations

1. Python Basics

* Variables and Expressions
* Data Types
  + Integers and floats
  + Strings
  + Lists
  + Tuples
  + Sets
  + Ranges
  + Dictionaries
  + Map
  + Converting between collection types
  + Two-dimensional sequences
* Decision Statements/Conditionals
  + Selection: if statement
  + More on the if statement
  + Boolean values, operators and expressions
  + The None value
  + The while statement
  + The for statement
  + Nested loops
  + Iterables, iterators and generators
  + Comprehensions
  + The break and continue statements
* Functions
  + Input parameters
  + Return values
  + The stack
  + Default parameters
  + \*args and \*\*kwargs
  + Decorators
  + Lambdas
  + Generator functions and yield
  + List Comprehension
  + Filter
* Errors and exceptions
  + Handling exceptions
  + Debugging programs
  + Logging
* Packaging and testing
  + Modules
  + Packages
  + Documentation
  + Testing
* Standard Library
  + Date and time: datetime
  + Mathematical functions: math
  + Pseudo-random numbers: random
  + Matching string patterns: re
  + Parsing CSV files: csv
  + Writing scripts: sys and argparse

2. Introduction of Object-Oriented Programming

3. Classes and Objects

* Defining and using a class
* Instance attributes
* Class attributes
* Class decorators
* Inspecting an object
* Overriding magic methods

4. Composition

5. Encapsulation

6. Polymorphism

7. Enumeration

8. Inheritance

9. Abstraction

10. Library (Array, NumPy, Pandas, shallow and deep copies)

11. Introduction to GUI programming with tkinter

* Event-driven programming
* tkinter basics
* Layout options
* Custom events
* Putting it all together

12. Sorting, searching and algorithm analysis

* Sorting algorithms
* Searching algorithms
* Algorithm complexity and Big O notation

13. Networked programs

14. Using Web Services

15. Using Databases and SQL

16. Data Libraries