

Scientific Computing

(15CSE387/3)

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Syllabus

Unit I: Python Programming – Introduction -basics; Python flow control – control statements, loops; Data types – Numbers, String, Set, Tuple, Dictionary; Functions - Function Argument, Recursion, Anonymous Function; File operations, Exceptions and Exception handling.

Unit II: Familiarize with Python Libraries - NumPy, SciPy

Unit III: Systems of Linear Algebraic equations: Introduction, Matrix Operation, Gauss Elimination Method, LU decomposition

Evaluation Pattern

Assessment	Internal	External
Internal Assessment <ul style="list-style-type: none">○ Lab Assignments – 60○ Mid Term Exam - 20	80	
End Semester <ul style="list-style-type: none">○ Lab Examination – 15○ Viva - 5		20

Textbooks & References

1. Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, Cengage Learning, ISBN: 978-1111822705.
2. Jaan Kiusalaas, “Numerical Methods in Engineering with Python”, Cambridge University Press, 2005.

Python Programming Environment

- **IDE**

- PyCharm (<https://www.jetbrains.com/pycharm/>)

- Python 3 - [Setting up Python using pycharm](#). You can use any 3.x version of Python. Please do not use 2.x as it is deprecated.

- Pycharm debugging - [Learn how to use a debugger](#).

- Jupyter (<https://programminghistorian.org/en/lessons/jupyter-notebooks>)

- **Online Compiler**

- <https://colab.research.google.com/>

- <https://repl.it/new/python3>

Why we need to learn Python Programming ?

JAVA

```
public class AddTwoIntegers {  
  
    public static void main(String[] args) {  
  
        int first = 10;  
        int second = 20;  
  
        int sum = first + second;  
  
        System.out.println("The sum is: " + sum);  
    }  
}
```

PYTHON

```
first = 10  
second = 20  
sum = first + second  
print("The sum is:", sum)
```

Why learn **Python Programming** ?

- Python is **easy to learn**. Its **syntax is easy** and code is very readable.
- Python has a lot of applications.
 - Machine Learning
 - Web Applications
 - Data Analysis
 - Scientific Research, and so on.
- Python allows you to write programs in **fewer lines of code** than most of the programming languages.
- The **popularity** of Python is **growing rapidly**. Now it's one of the most popular programming languages.