

**PG Department of Mathematics**  
**Value added course – PYTHON**

**Third Semester**

**Total Hours : 30**

**Course Outcome**

Students are able to

- CO1 : Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements
- CO2 : Express proficiency in the handling of strings and functions
- CO3 : Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
- CO4 : Identify the commonly used operations involving file systems and regular expressions.

**Syllabus**

**COURSE CONTENT**

**Unit I - Introduction to NumPy**

What is NumPy? Installation and setup. Creating arrays. Basic operations: indexing, slicing, and broadcasting. Array attributes: shape, size, dtype.

**Unit II - Advanced NumPy operations**

Mathematical operations: dot product, sum, cumsum, transpose, Logical operations: comparison, boolean indexing, masking Universal functions: sin, cos, exp, log.

**Unit III- Introduction to Pandas**

What is Pandas? Installation and setup Pandas data structures: Series and DataFrame. Reading and writing data with Pandas. Indexing and selecting data in Pandas Data manipulation with Pandas, Sorting and filtering data. Handling missing data. Merging and joining data, Grouping and aggregating data.

Reference Books- Mastering Python data Science,  
Numerical Python, Robert Johansson,