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Course Description:

Data Science and Machine Learning details for students and Corporate Candidates.

Data Science and Machine Learning

Data Science:

NumPy :-

- Array objects
 - o The N-dimensional array (ndarray)
 - o Scalars
 - o Data type objects (dtype)
 - o Indexing
 - o Iterating Over Arrays
 - o Standard array subclasses
 - o Masked arrays
 - o The Array Interface
 - o Datetimes and Timedeltas
- Constants
- Universal functions (ufunc)
 - o Broadcasting
 - o Output type determination
 - o Use of internal buffers
 - o Error handling
 - o Casting Rules
 - o Overriding Ufunc behavior
 - o ufunc
 - o Available ufuncs
- Routines
 - o Array creation routines
 - o Array manipulation routines
 - o Binary operations
 - o String operations
 - o C-Type Foreign Function Interface (numpy.ctypeslib)
 - o Datetime Support Functions
 - o Data type routines
 - o Optionally Scipy-accelerated routines (numpy.dual)
 - o Mathematical functions with automatic domain (numpy.emath)
 - o Floating point error handling

- o Discrete Fourier Transform (numpy.fft)
- o Financial functions
- o Functional programming
- o NumPy-specific help functions
- o Indexing routines
- o Input and output
- o Linear algebra (numpy.linalg)
- o Logic functions
- o Masked array operations
- o Mathematical functions
- o Matrix library (numpy.matlib)
- o Miscellaneous routines
- o Padding Arrays
- o Polynomials
- o Random sampling (numpy.random)
- o Set routines
- o Sorting, searching, and counting
- o Statistics
- o Test Support (numpy.testing)
- o Window functions
- Packaging (numpy.distutils)
- o Modules in numpy.distutils
- o Building Installable C libraries
- o Conversion of .src files
- NumPy C-API
- o Python Types and C-Structures
- o System configuration
- o Data Type API
- o Array API
- o Array Iterator API
- o UFunc API
- o Generalized Universal Function API
- o NumPy core libraries
- o C API Deprecations
- NumPy internals
- o NumPy C Code Explanations
- o Internal organization of numpy arrays
- o Multidimensional Array Indexing Order Issues
- NumPy and SWIG
- o numpy.i: a SWIG Interface File for NumPy
- o Testing the numpy.i Typemaps

Pandas:-

- python Pandas - Environment Setup
- Introduction to Data Structures
- Python Pandas - Series
- Python Pandas - DataFrame
- Python Pandas - Panel

- Python Pandas - Basic Functionality
- Descriptive Statistics
- Function Application
- Python Pandas - Reindexing
- Python Pandas - Iteration
- Python Pandas - Sorting
- Working with Text Data
- Options & Customization
- Indexing & Selecting Data
- Statistical Functions
- Python Pandas - Window Functions
- Python Pandas - Aggregations
- Python Pandas - Missing Data
- Python Pandas - GroupBy
- Python Pandas - Merging/Joining
- Python Pandas - Concatenation
- Python Pandas - Date Functionality
- Python Pandas - Timedelta
- Python Pandas - Categorical Data
- Python Pandas - Visualization
- Python Pandas - IO Tools
- Python Pandas - Sparse Data
- Python Pandas - Caveats & Gotchas
- Comparison with SQL

SciPy Tutorial

- Introduction
- Basic functions
- Special functions (scipy.special)
- Integration (scipy.integrate)
- Optimization (scipy.optimize)
- Interpolation (scipy.interpolate)
- Fourier Transforms (scipy.fftpack)
- Signal Processing (scipy.signal)
- Linear Algebra (scipy.linalg)
- Sparse Eigenvalue Problems with ARPACK
- Compressed Sparse Graph Routines (scipy.sparse.csgraph)
- Spatial data structures and algorithms (scipy.spatial)
- Statistics (scipy.stats)
- Multidimensional image processing (scipy.ndimage)
- File IO (scipy.io)

Matplotlib

- Installing
- Interactive plots
- What's new in Matplotlib 3.0

- Credits
- Troubleshooting
- Environment Variables
- Working with Matplotlib in Virtual environments
- Working with Matplotlib on OSX
- The Matplotlib API
- API Overview
- Modules
- Toolkits
- External Resources
- Specialty plots
- Interactivity

Machine Learning

- 🔗 Machine Learning Terminology
- 🔗 k-nearest Neighbor Classifier
- 🔗 Neural Networks from Scratch in Python
- 🔗 Neural Network in Python using Numumpy
- 🔗 Backpropagation in Neural Networks
- 🔗 Confusion Matrix
- 🔗 Training and Testing with MNIST
- 🔗 Dropout Neural Networks
- 🔗 Neural Networks with Scikit
- 🔗 Machine Learning with Scikit and Python
- 🔗 Introduction Naive Bayes Classifier
- 🔗 Naive Bayes Classifier with Scikit
- 🔗 Introduction into Text Classification using Naive Bayes
- 🔗 Python Implementation of Text Classification
- 🔗 Decision Trees
- 🔗 Regression Trees
- 🔗 Random Forests
- 🔗 Boosting Algorithm
- 🔗 Principal Component Analysis
- 🔗 Linear Discriminant Analysis
- 🔗 Expectation Maximization and Gaussian Mixture Model
- 🔗 Introduction into TensorFlow

Programming with Python

- NumPy with Python
- Using pandas Data Frames to solve complex tasks
- Use pandas to handle Excel Files
- Web scraping with python
- Connect Python to SQL
- Use matplotlib and seaborn for data visualizations

- Use plotly for interactive visualizations
- Machine Learning with SciKit Learn, including:
- Linear Regression
- K Nearest Neighbors
- K Means Clustering
- Decision Trees
- Random Forests
- Natural Language Processing
- Neural Nets and Deep Learning
- Support Vector Machines