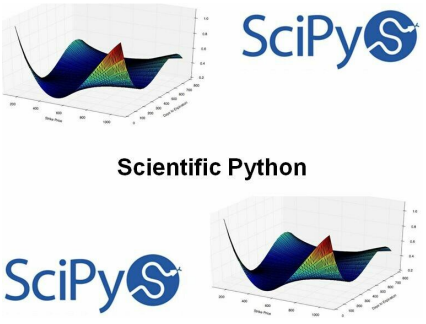
Scientific Python

Duration: 2 days Price: € 1499

Open Schedule



Audience Scientific Python Course

Scientists, mathematicians, engineers and others who want to use the SciPy Python library to create applications and perform data analysis.

Prerequisites Course Scientific Python

Knowledge of Python programming and the NumPy library is required. Some knowledge of numerical methods in scientific computing is beneficial for the understanding.

Realization Training Scientific Python

The theory is dealt with on the basis of presentation slides. The concepts are illustrated with demos. The theory is interspersed with exercises. The course times are from 9.30 to 16.30.

Certification Course Scientific Python

The participants get well after completion of the course, an official certificate Scientific Python.

Content Course Scientific Python

In this course the participants will learn what can be done with the Python SciPy library for scientific computing.

Matrices in Science

The course starts with an overview of the role of matrices to solve problems in scientific computing.

Matrix Manipulation

Next the course proceeds by reviewing basic manipulation and operations on them, followed by factorizations, solutions of matrix equations, and the computation of eigenvalues and eigenvectors.

Interpolation and Approximation

Also interpolation and approximation is treated where advanced techniques are shown to approximate functions and their applications in scientific computing.

Differentiation en Integration

Differentiation techniques to produce derivatives of functions are discussed as well as integration techniques showing how to compute areas and volumes effectively.

Computational Geometry

The module Computational Geometry takes a tour of the most significant algorithms in this branch of computer science.

Statistics and Data Mining

And finally the course pays attention to statistical inference, machine learning, and data mining.

Modules Course Scientific Python

Module 1 : SciPy Intro	Module 2 : Matrix Calculations	Module 3 : Nonlinear Equations
What is SciPy Installing SciPy stack Anaconda distribution Constructing matrices Using ndarray class Using matrix class Sparse matrices Linear operators Scalar multiplication Matrix addition Matrix multiplication Traces and determinants Transposes and inverses	Singular value decomposition Matrix equations Least squares Spectral decomposition Interpolations Univariate interpolation Nearest-neighbors interpolation Other interpolations Differentiation and Integration Numerical differentiation Symbolic differentiation Symbolic integration Numerical integration	Non-linear equations and systems Iterative methods Bracketing methods Secant methods Brent method Simple iterative solvers The Broyden method Powell's hybrid solver Large-scale solvers Optimization Unconstrained optimization Constrained optimization Stochastic methods
Module 4 : Computational Geometry	**Module 5 : Descriptive Statistics**	**Module 6 : Inference and Data Analysis**
Plane geometry Static problems Convex hulls Voronoi diagrams Triangulations Shortest paths Geometric query problems Point location Nearest neighbors Range searching Dynamic problems Bézier curves	Probability Symbolic setting Numerical setting Data exploration Picturing distributions Bar plots Pie charts Histograms Time plots Scatterplots and correlation Regression Analysis of the time series	Statistical inference Estimation of parameters Bayesian approach Likelihood approach Interval estimation Frequentist approach Bayesian approach Likelihood approach Data mining Machine learning Trees and Naive Bayes Gaussian mixture models
Module 7 : Mathematical Imaging		
Digital images Binary Gray-scale Color Alpha channels Smoothing filters Multivariate calculus Statistical filters Fourier analysis Wavelet decompositions Image compression Image editing Rescale and resize Swirl Image restoration Noise reduction		

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