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# Python Practitioners.

Training course prospectus



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# Introduction.

Python is one of the two dominant programming languages in the field of Data Science and Data Engineering. In the corporate world, Python is the leading language for Machine Learning, Deep Learning and AI.

Python is easy to use, yet extremely powerful, with thousands of contributed packages that extend its functionality and provide unlimited possibilities for a wide array of use cases.

## Why train with us?

We are the most experienced Data Science Learning and Development company in the R and Python community and have upskilled analytics and data science teams for some of the biggest brands in the world, enabling them to gain actionable insights from their data.

We support organisations from a range of industries to build effective data science Python skilled teams; helping them to develop and deploy a wide range of analytics and AI initiatives, ranging from initial exploratory work through to integrated platforms, hosting complex multifaceted applications with game-changing potential for our clients.

Our Data Experts are responsible for designing and delivering our live private training programmes in a fully interactive manner and our courses are consistently rated as 92% Excellent.

## Ascent's R training: Benefits at a glance.

- **Global training for all skill levels:** Our training courses range from beginner to intermediate learning with expert mentoring consultancy for applied learning at advanced levels.
- **Flexibility of engagement:** Programmes are designed to deliver a fully interactive experience for course participants, either delivered face to face on premise or via virtual classroom.
- **Business-focused insights:** Our instructors have extensive subject matter experience and real-world application knowledge; this means they have a unique skill set which allows them to bring theory to life.



- **Beyond R:** We upskill in a variety of technical and non-technical areas, including R and Data Literacy programmes for business leaders.
- **Materials, certification, and post course support:** As standard, we provide comprehensive course materials, practice exercises, example code, attendance certificates and post course email support.





# Python training courses.

## Pinpoint the path to data-science excellence.

We assess teams and individuals and prioritise training to build internal capability, guided by Data Science Radar - a tool representing the cumulation of our experience in data science consulting and participation in the Python community. Data Science Radar leverages a proprietary 'trait' model of data science skills to help organisations recruit and retain the right talent - and enable individuals to prioritise their learning and development.

The DSR traits are: Programmer, Modeller, Visualiser, Communicator, Data Wrangler and Technologist.



### Breakthrough.

Introduction to Python for Analytics, Fundamentals of Modelling in Python.



### Foundation.

Programming in Python for Analysts, Machine Learning in Python.



### Intermediate.

Time Series in Python, Intermediate Python Programming.



### Proficient.

Package Building for Python.



### Advanced/Mastery.

For more advanced and mastery level learning needs we take a more consultative mentoring approach to ensure applied learning to address business challenges. Our Data Scientists can help you with real-world applied learning, use case planning, project prioritisation and mobilisation. For this level of education, we will work with you to define a program which provides real-world value and addresses your advanced learning needs.



Course title	Course duration	Level
Introduction to Python for Analytics	2-day	Breakthrough
Fundamentals of Modelling in Python	1-day	Breakthrough
Data Science Best Practices	0.5-day	Foundation
Programming in Python for Analysts	1-day	Foundation
Machine Learning in Python	2-day	Foundation
Time Series in Python	1-day	Intermediate
Intermediate Python Programming	1-day	Intermediate
Package Building in Python	1-day	Proficient



Level:



Breakthrough  
(1)

Duration:



# Introduction to Python for Analytics.

**This two day introduction to Python focuses on getting started with common data tasks. By the end of this course, attendees will be confident in how they can import data, perform common manipulation tasks and visualise data. Along the way they will be introduced to a variety of data types including dates and categorical data. This course will be taught using the popular pandas package and is ideal for those new to Python who want to quickly get started with analytics in Python.**

This will be a hands on course taught using Jupyter Notebooks with exercises throughout. All attendees will need access to a computer and will need to have pre-installed a recent version of Anaconda and will need to be able to install Python packages. The course will be taught by Mango Solutions consultants.

## Prerequisites.

No prior knowledge of Python or programming is assumed.

## Details.

### The Python environment:

- Anaconda distribution
- Using Jupyter
- Basic operations
- Modules, imports and packages
- The help system

### Getting data into Python:

- Importing csv data (with pandas)
- Importing other data formats
- Understanding data in Python

### Data Manipulation:

- Querying data
- Adding/updating columns
- Summarising data
- Grouping data
- Data pipelines

### Working with dates, categories and strings:

- Working with dates and times
- Working with categorical data
- Working with strings
- Strings and series

### Visualising data with seaborn:

- Creating a basic plot
- Different types of plots
- Customising appearance with themes

### Statistics and modelling:

- Statistical tests
- Linear models

### Tidy data:

- Concept of tidy data
- Changing the shape of data
- Merging/joining two datasets



Level:

Breakthrough  
(1)

Duration:



# Fundamentals of Modelling in Python.

**This one day course is intended as a practical introduction to the basics of analytics. Taught using Python, attendees will be introduced to ideas such as sampling, statistical testing and linear modelling, using packages such as statsmodels. This course provides the foundations that are built upon for advanced analytic topics including machine learning.**

This will be a hands-on course taught using the Jupyter Notebooks with exercises throughout. All attendees will need access to a computer and will need to have pre-installed a recent version of Anaconda and will need to be able to install Python packages.

## Prerequisites.

It is assumed that participants have attended the Introduction to Python for Analytics or similar.

It is assumed that attendees are familiar with basic data concepts such as data types, and summary statistics (pre-reading can be provided for those that require a refresher on these topics).

## Details.

### Sampling and Distributions:

- Populations and samples
- The Normal distribution
- Useful distributions (Poisson & Binomial)
- Confidence intervals

### Statistical Testing (A/B Testing):

- Defining a statistical test
- Testing a difference in means
- Multiple testing
- Types of error

### The Linear Model:

- A simple linear model
- Understanding the output
- Is it a good model?
- Multiple regression
- Picking the best model

### Extending the Linear Model:

- Models for binary data
- Models for counts





Level:



Foundation  
(2)

Duration:



# Data Science Best Practices.

## Data Science Best Practices.

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**For those who have a basic understanding of programming, to ensure that their data science projects always follow best practices in all, and to help emphasise the importance of best practices when working in a team – as we know, Data Science is a team sport. While all the Mango training courses help to instil these best practices; this course focuses on what the options are and why we need to use them in a language agnostic setting. This course outlines the key best practices associated with the 6 core traits of a data science team and project: communication, data wrangling, modelling, programming, technology, and visualisation.**

This course is delivered by one of our practicing data science consultants, as a half day interactive session, supplemented by a presentation, with discussion points throughout.

### Prerequisites.

Attendees are expected to have some knowledge of programming in either R or Python and have attended our Delivering Successful Analytics Projects course (or similar).

### Details.

#### Communication:

- Collaboration (incl. multi-user version control)
- Code and process documentation
- Project framework (scoping, planning, presenting results, IDEaL framework)

#### Data Wrangling:

- FAIR principles
- Data governance & ethics
- Data tools

#### Modelling:

- Choosing the best models (what to model, performance, uncertainty, interpretability, etc.)
- Productionising models (reproducible model code, deployment and maintenance)

#### Programming:

- Methods of code design (TDD, pseudo code, working with legacy code)
- Development method (PP, code review, iterative approach etc.)
- Coding standards
- Testing and code coverage
- Package building

#### Technology:

- Architecture design (infrastructure, pipeline planning, implementation and monitoring, CI/CD, version control)
- Reproducible Projects

#### Visualisation:

- Designing data visualisations (choosing graph type and data, the narrative, common pitfalls, what to include)



Level:



Foundation  
(2)

Duration:



# Programming in Python for Analysts.

Once you have started to use Python for common data manipulation tasks you will quickly find that you want to be able to do more. This one day course introduces the topics that you will need to be familiar with in order to get the most from Python. This course will go into detail on essential Python knowledge including how to manage your installation of Python, the main Python data structures and how to iterate over them in a Pythonic way. This course will also teach you how to write functions and use them in the context of data analysis to write data pipeline.

This will be a hands-on course taught using Jupyter Notebooks with exercises throughout. All attendees will need access to a computer and will need to have pre-installed a recent version of Anaconda and will need to be able to install Python packages. The course will be taught by Mango Solutions consultants.

## Prerequisites.

Attendees are expected to have a basic understanding of Python and analytics, and should have taken the Introduction to Python for Analytics or similar.

## Details.

### The Python Command Line:

- The Python path
- Python and conda command line tools
- Managing installed packages

### Python Data Objects:

- Creating and subscripting objects
- Base Python data structures
- Numpy and pandas data structures

### Iteration:

- The basics of loops
- Iterating over Python data objects
- Advanced loops and iteration

### Writing Python Functions:

- The basics of function writing
- Function arguments and outputs
- Control structures (if, else)

### Applying Functions to DataFrame:

- Writing functions for DataFrames
- Pandas data pipelines
- Iterating over DataFrames



Level:



Foundation  
(2)

Duration:



# Machine Learning in Python.

**This two-day course is aimed at not only teaching an understanding of some of the most common machine learning techniques, but also the approach to implementing machine learning. During this course attendees will learn how to define a problem and prepare data, the range of techniques available for solving common problems and the approaches to take to evaluate models and achieve the best results possible.**

This will be a hands-on course taught using Python with exercises throughout. All attendees will need access to a computer and will need to have pre-installed a recent version of Anaconda. They will also need to be able to install Python packages and any data sets required for the training, details of which will be provided prior to the sessions. The course will be taught by Mango Solutions consultants.

## Prerequisites.

A good working knowledge of R programming is assumed, attendees should have a good working knowledge of Python and should have completed or be familiar with the content of the Programming in Python for Analysts course.

Basic knowledge of statistics is assumed (i.e. participants should be comfortable with the contents of the Fundamentals of Modelling for Data Science course).

No prior knowledge of Machine Learning is assumed.

## Details.

### What is Machine Learning?

- Types of Learning
- Deep Learning
- Machine Learning in Python

### Getting in Shape:

- Column Types
- Types of Prediction
- Identifiers
- Features
- Missing Data
- Exploratory Data Analysis

### Fitting a Model:

- Machine Learning Workflow
- Splitting the Data
- Fitting and Scoring the Model

### Data Pre-Processing:

- Data Standardisation
- Imputing Missing Data
- Categorical and Mixed Variables

### Algorithms:

- Decision Trees
- Random Forest
- Gradient Boosted Trees

### Resampling:

- xgboost Model
- Grid Search
- Random Search
- Other Methods

### Full Machine Learning Pipeline



Level:

Intermediate  
(3)

Duration:



# Time Series in Python.

**This course is designed to provide an overview of time series modelling and forecasting using the Python language. We will introduce some of the common time series modelling techniques as well as how to implement them in Python. By the end of this course, attendees will be confident in how they perform time series data exploration, manipulation tasks in relation to dates and times, and forecasting from fundamental machine learning and classical statistical modelling perspectives.**

This will be a hands-on course taught using the Jupyter Notebooks with exercises throughout. All attendees will need access to a computer and will need to have pre-installed a recent version of Python and Anaconda and will need to be able to install Python packages. The course will be taught by Mango Solutions consultants.

## Prerequisites.

Attendees are expected to have basic understanding of data analysis. Prior knowledge of programming in Python is preferred but not essential.

## Details.

### Introduction :

- What is a Time Series?
- Packages
- Further Reading

### Exploring Time Series Data:

- Data Import
- Visualisation
- Time Series Decomposition

### Manipulation of Time Series Data:

- a Single Date
- a Sequence of Dates

### Forecast Workflow:

- Pre-process
- Visualise
- Specify
- Fit
- Evaluation
- Forecast

### Classical Time Series Models:

- Exponential Smoothing models
- ARIMA models



Level:



Intermediate  
(3)

Duration:



# Intermediate Python Programming.

**For those who have already begun programming in Python, this one-day course is designed to provide an introduction to more advanced topics that will enable users to write more advanced Python code and give teams the tools they need to collaborate on larger Python code-bases. Including introductions to object-oriented systems and more advanced function control, by the end of this course attendees will be able to make their code faster and more robust and easier for end users to interact with.**

This will be a hands-on course taught using Jupyter Lab with exercises throughout. All attendees will need access to a computer and will need to have pre-installed a recent version of Anaconda and will need to be able to install Python packages. The course will be taught by Mango Solutions' consultants.

## Prerequisites.

Attendees are expected to have a strong working knowledge of Python and should have attended Mango's Programming in Python for Analysts course or similar.

## Details.

### Python for Software Development:

- Using an IDE
- Structuring a project
- Managing Python environments

### Writing Robust Functions:

- Warnings, errors and messages
- Exception handling
- Assertions
- Generators

### Debugging/Profiling:

- Inserting breakpoints
- Browsing the function environment
- Profiling Python code
- Common efficiency gains

### Object Oriented Programming:

- Recap of the class system
- Attributes and methods
- Creating classes
- Overloading



Level:



Proficient  
(4)

Duration:



# Package Building for Python.

**Being able to build packages allows you to work more effectively and easily share code with colleagues or even the wider Python community. In this course we will focus on how you can quickly get started with building packages, understand the benefits of package building best practices and be able to implement them. This includes being able to write documentation, creating tests, distributing your package and understanding the benefits of version control systems and how they can enhance your package building.**

This will be a hands-on course taught using the Jupyter Lab with exercises throughout. All attendees will need access to a computer and will need to have pre-installed a recent version of Anaconda and will need to be able to install Python packages.

## Prerequisites.

Attendees are expected to have a strong understanding of python. Whilst not mandatory, it is recommended that attendees have completed Mango's Intermediate Python programming or similar.

## Details.

### Package Structure:

- Modules
- Packages and sub-packages

### Documenting and Testing:

- Documenting code and projects
- Testing with pytest
- Including tests in a package

### Building and Distributing:

- Creating setup and requirements files
- Building a package using virtual environments
- Installing a package

### Best Practices for Package Building:

- Coding best practices
- Using version control
- Test coverage and Continuous Integration



