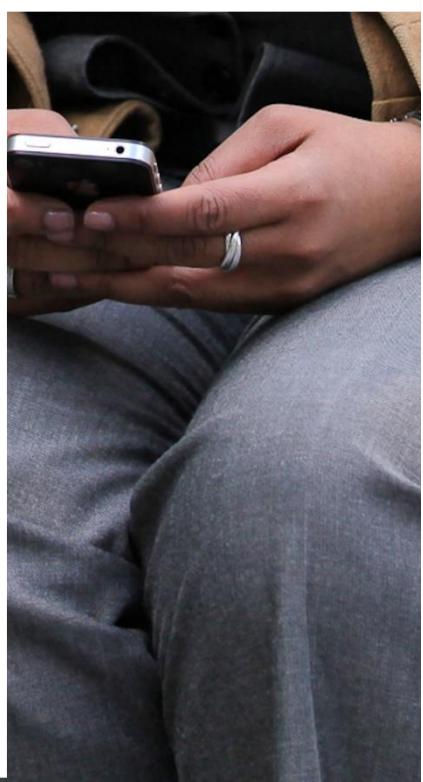
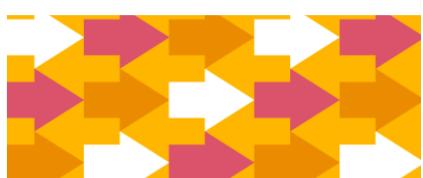


PwC Business School

# PwC Data & Analytics Academy Curriculum

[www.pwc.com/ng](http://www.pwc.com/ng)





# Introduction

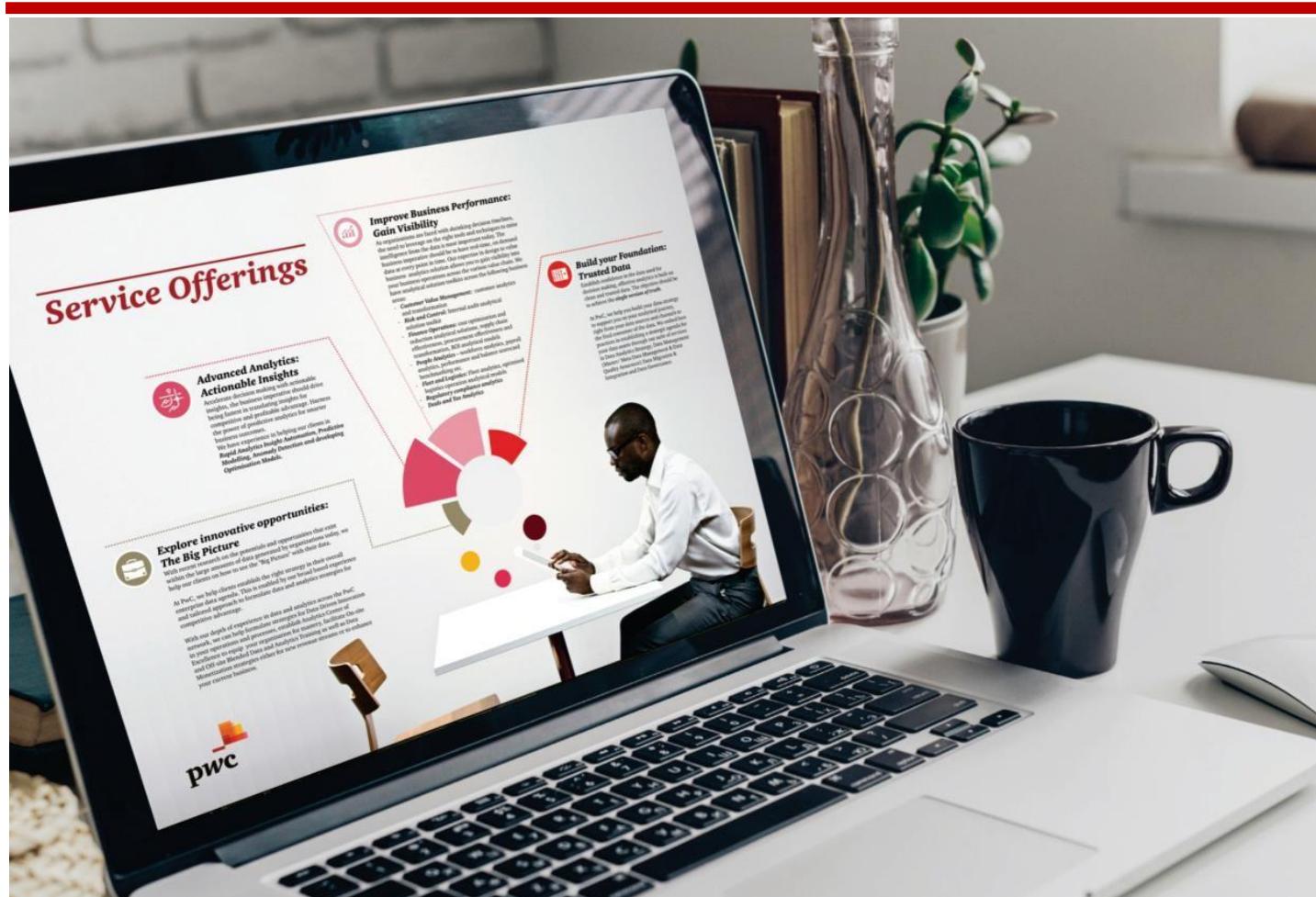
PwC's Data Analytics Academy provides a range of big data training designed to help organizations enable new and existing internal resources to make the most of key data science tools and platforms.

Data Science courses are designed to deliver the basic requirement for any data scientist and big data analysts to make business impact. The courses cover core data science programming tools and applications to entrench the necessary background knowledge.

The training sessions are delivered in comfortable conference room at direct serene locations across the country and around the world. Training course participants should be reasonably proficient in Excel and are also required to bring their own machines (laptops) and install the necessary tools in advance of any of the courses.

## PwC D&A Academy programs offer:

1. Hands-on, in-person training.
2. Printed training material.
3. Morning Snacks, Lunch, Afternoon Snacks and Refreshments.
4. Guaranteed small class size. The programs are confirmed with a minimum of ten (10) participants and sealed at a maximum of twenty (20) participants. With such small class sizes there will be plenty of time to ask questions and receive personal attention from the faculties.
5. A highly consultative engagement. There will be plenty of time to discuss your specific projects and learning objective to provide immediate return on investments upon completion of any of the programs.



# Data Science for Business Professionals

## 01

### Course Overview

In this complex, digital world, clients want help to understand their data to drive greater insight, improved performance and competitiveness. The course will introduce participants to the important techniques and methods to become more efficient in delivering their daily objectives and also improve their work ethics.

PwC's Data & Analytics Academy course for beginners, is designed for:

- Graduate Trainees
- Data Analysts
- Business Analysts
- Professionals looking to change career path

This course delivers the basic requirement for any aspiring data scientist and big data analysts to make business impact in three days. The course covers the core concepts of analytics and reporting with introduction to the use of a visualization tool (often PowerBI) to entrench the necessary background knowledge.

### Course Outline

• Day •  
**1**

#### Introduction to Data Science

- Data Science Fundamentals I
- Introduction to Visualization
- Test/Assessment

• Day •  
**2**

#### Exploratory Data Analysis/Visualisation

- Data Visualization / Dashboarding Fundamentals
- Practical data Visualization using PowerBI/Tableau
- Visualization / Dashboarding Case Study I
- Test/Assessment

• Day •  
**3**

#### Intermediate Data Analytics for Beginners

- Data Visualisation/ Dashboarding for Enterprise Reporting
- Visualization / Dashboarding Case Study II
- Test/Assessment



#### Pre-requisites

Microsoft Excel

#### Date

27th – 29th January 2020  
24th - 26th February 2020  
23rd - 25th March 2020  
27th – 29th April 2020  
25th – 27th May 2020  
22nd – 24th June 2020  
8th – 10th July 2020  
3rd – 5th August 2020  
7th – 9th September 2020  
9th – 11th November 2020  
2nd – 4th December 2020

#### Time

9am – 4pm daily

#### Fees

Contact us

#### Venue

PwC Annexe  
17 Chief Yesufu Abiodun Way  
Oniru Estate  
Victoria Island, Lagos

# Data Science for Beginners

## 02

### Course Overview

In this complex, digital world, clients want help to understand their data to drive greater insight, improved performance and competitiveness. The course will introduce participants to the important techniques and methods used by data scientists.

PwC's Data & Analytics Academy course for beginners, is designed for:

- Graduate Trainees
- Data Analysts
- Business Analysts
- Professionals looking to change career path

This course delivers the basic requirement for any aspiring data scientist and big data analysts to make business impact in five days. The course covers the two core data science programming tool; R Package and Python courses to entrench the necessary background knowledge.

### Course Outline

• Day •  
**1**

#### Introduction to Data Science

- Data Science Fundamentals I
- Introduction to R
- Test/Assessment

• Day •  
**2**

#### Exploratory Data Analysis/Visualisation

- Introduction to Visualization
- Practical data Visualisation using PowerBI
- Introduction to SQL

• Day •  
**3**

#### Intermediate Data Analytics for Beginners

- Data Science fundamentals II
- Introduction to modelling
- Test/Assessment

• Day •  
**4**

#### Advanced Analytics for Beginners

- Linear Regression
- Logistic Regression
- Model Diagnostics

• Day •  
**5**

- Introduction to Time Series Modelling/forecasting
- Beginners course personal project/case study



#### Pre-requisites

#### Date

17th – 21st February 2020  
20th - 24th April 2020  
22nd - 26th June 2020  
17th – 21st August 2020  
19th – 23rd October 2020  
7th – 11th December 2020

#### Time

9am – 4pm daily

#### Fees

Contact us

#### Venue

PwC Annexe  
17 Chief Yesufu Abiodun Way  
Oniru Estate  
Victoria Island, Lagos

# Data Science for Intermediate

## 03

### Course Overview

Becoming a senior data scientist takes more than the understanding of basic skills like statistics and programming in various languages. The need to develop one area of technical analytic expertise (e.g. machine learning), while being conversant in many others is very critical. This is the major objective of this course.

By the end of this intermediate data science course, you'll be ready to:

- Build data solutions that integrate with other systems.
- Implement advanced data science concepts like machine learning and inferential statistics to address critical business problems and influence corporate decision making.
- Participate successfully in data science competitions.

### Course Outline

• Day •  
**1**

#### Data Wrangling

- Data in Databases: Get an overview of relational and NoSQL databases and practice data manipulation with SQL.
- Introduction to Data Visualization using PowerBI/Tableau/Qlik Sense
- Review of Statistical Methods

• Day •  
**5**

#### Introduction to Advanced Analytics Techniques

- Text Mining
- Simulation of sentimental analysis
- Introduction to Optimization – Causal and Mechanistic Analytics
- Time Series and Forecasting
- Guided Project

• Day •  
**2**

#### Inferential Statistics

- Data Science Fundamentals II
- Theory and application of inferential statistics
- Parameter estimation
- Hypothesis testing
- Introduction to A/B Testing

• Day •  
**3**

#### Predictive Analytics I – Linear Modelling

- Linear Algebra Overview
- Exploratory Data Analysis
- Linear Regression
- Multiple Linear Regression
- Regression Diagnostics
- Logistic Regression
- Statistics Assessments



• Day •  
**4**

#### Predictive Analytics II - Machine Learning

- Scikit-learn
- Supervised and unsupervised learning
- Random Forest, SVM, clustering
- Dimensionality reduction
- Validation & evaluation of ML methods

#### Pre-requisites

Data Science for beginners course plus a minimum of 3 months post training application

#### Date

9th - 13th March 2020  
18th - 22th May 2020  
26th - 30th October 2020

#### Time

9am – 4pm daily

#### Fees

Contact us

#### Venue

PwC Annexe  
17 Chief Yesufu Abiodun Way  
Oniru Estate  
Victoria Island, Lagos

# Advanced and Predictive Analytics Program

## 04

### Course Overview

Going beyond descriptive analytics has become essential to meet the complexities of information requirement for decision making as well as developing strategies to drive greater profitability, improved performance and competitiveness. The course builds expertise in advanced analytics, data mining, predictive modeling, quantitative reasoning and web analytics, as well as advanced communication and leadership.

PwC's Data & Analytics Academy advanced and predictive analytics course covers the following:

- Articulate analytics as a core strategy
- Transform data into actionable insights
- Develop statistically sound and robust analytic solutions
- Evaluate constraints on the use of data
- Assess data structure and data lifecycle

This course integrates data science, information technology and business applications into three areas: data mining, predictive (forecasting) and prescriptive (optimisation and simulation) analytics.

### Course Outline



#### Math for Modelers

Techniques for building and interpreting mathematical/statistical models of real-world phenomena in and across multiple disciplines, including matrices, linear programming and probability with an emphasis on applications will be covered.

This is for participants who want a firm understanding and/or review of these fields of mathematics/statistics prior to applying them in subsequent topics.

#### Introduction to Statistical Methods

Participants will learn to apply statistical techniques to the processing and interpretation of data from various industries and disciplines.

Topics covered include probability, descriptive statistics, study design and linear regression. Emphasis will be placed on the application of the data across these industries and disciplines and serve as a core thought process through the entire Predictive Analytics curriculum.

#### Data Preparation

In this course, Participants explore the fundamentals of data management and data preparation. Participants acquire hands-on experience with various data file formats, working with quantitative data and text, relational (SQL) database systems, and NoSQL database systems.

They access, organize, clean, prepare, transform, and explore data, using database shells, query and scripting languages, and analytical software.

This is a case-study- and project-based course with a strong programming component

# Advanced and Predictive Analytics Program

04

## Course Outline

• Day •

2

### Generalised Linear Models

This extends Regression and Multi Analysis by introducing the concept of Generalised Linear Model “GLM”. Review s the traditional linear regression as a special case of GLMs, and then continues w ith logistic regression, poisson regression, and survival analysis.

It is heavily weighted tow ards practical application w ith large data sets containing missing values and outliers. It addresses issues of data preparation, model development, model validation, and model deployment.

### Intro to Advanced and Predictive Analytics - Regression and Multivariate Analysis

This introduces the concept of advanced and predictive analytics, w hich combines business strategy, information technology, and statistical modeling methods. The course review s the benefits of analytics, organisational and implementation/ethical issues.

It develops the foundations of predictive modeling by: introducing the conceptual foundations of regression and multivariate analysis; developing statistical modeling as a process that includes exploratory data analysis, model identification, and model validation; and discussing the difference betw een the uses of statistical models for statistical inference versus predictive modeling.

The high level topics covered in the course include: exploratory data analysis, statistical graphics, linear regression, automated variable selection, principal components analysis, exploratory factor analysis, and cluster analysis.

In addition Participants w ill be introduced to the R statistical package, and its use in data management and statistical modeling.

Prerequisite: Introduction to Statistical Methods.

• Day •

3

### Time Series Analysis and Forecasting

This covers key analytical techniques used in the analysis and forecasting of time series data.

Review s the role of forecasting in organizations, exponential smoothing methods, stationary and nonstationary time series, autocorrelation and partial autocorrelation functions, Univariate ARIMA models, seasonal models, Box-Jenkins methodology, Regression Models w ith ARIMA errors, Transfer Function modeling, Intervention Analysis, and multivariate time series analysis.

Prerequisite: Generalized Linear Models

• Day •

4

### Machine Learning Techniques

In this course, several practical approaches to machine learning methods w ith business applications in marketing, finance, and other areas are covered.

The objective of this is to provide a practical survey of modern machine learning techniques that can be applied to make informed business decisions:

- Regression and classification methods
- Resampling methods and model selection
- Tree-based methods
- Support vector machines and kernel methods
- Principal components analysis and
- Clustering methods

# Advanced and Predictive Analytics Program

04

## Course Outline

At the end of this course, participants will have a basic understanding of how each of these methods learn from data to find underlying patterns useful for prediction, classification, and exploratory data analysis.

Further, each participant will learn the implementation of machine learning methods in the R statistical programming language for improved decision-making in real business situations.

A 2-hour project will involve participants applying multiple machine learning methods to solve a practical business problem.

**Prerequisite:** Introduction to Statistical Analysis.

• Day •  
5

### Guided Project

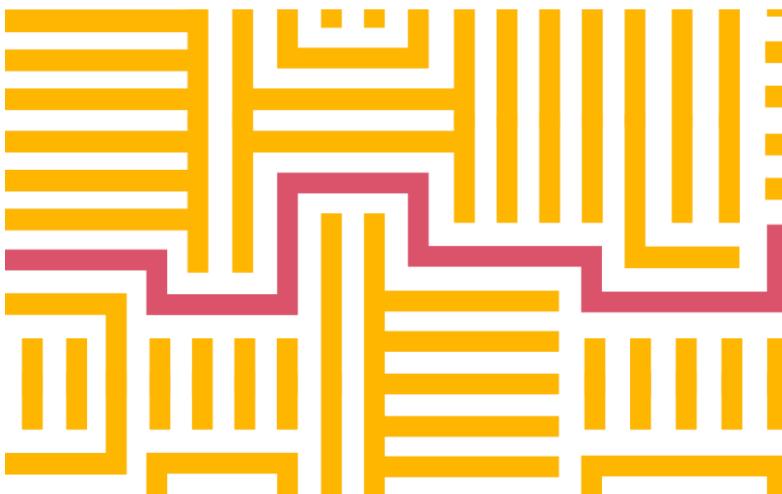
The course focuses on the practice of predictive analytics and it is the conclusion of the advanced and predictive analytics program.

It gives participants an opportunity to demonstrate their business strategic thinking, communication, and acquired analytics skills.

Business cases across various industries and application areas illustrate strategic advantages of analytics, as well as organizational issues in implementing systems for predictive analytics.

Participants will work in project teams, generating analytics project implementation plans.

**NOTE:** Section taught in Python is available independently.



Pre-requisites

Date

TBD

Time

9am – 4pm daily

Fees

Contact us

Venue

PwC Annexe  
17 Chief Yesufu Abiodun Way  
Oniru Estate  
Victoria Island, Lagos

# 2019/2020 Quarterly Data Science Master Class

# 05

## Course Overview

Our masterclass is laser-focused on building effective models. We will teach you the entire machine learning workflow, and you'll get to implement it on multiple real-world business situations.

The master classes are equipped with the tools required to put big data to practical use, essential tools to hire and manage data scientists effectively, and the necessary insights for leveraging analytics to increase efficiency and productivity, and seize new business opportunities.

Each course features 4 classic, hands-on projects that will be simulated through R. This approach is adopted for the masterclass to facilitate learning in proper contexts for masters tackling real business challenges.

PwC's 2019/2020 Quarterly Data Science Master Class, is a 6-hour event that happens quarterly to assist business executives lead conversations on data and analytics to drive business efficiency and profitability.

### Who Should Attend

- Senior leaders responsible for the data and analytics function in their organization
- Functional leaders

## Course Details

### Date

TBD

### Time

9am – 4pm daily

### Fees

Contact us

### Venue

PwC Annexe, 17 Chief Yesufu Abiodun Way, Oniru Estate  
Victoria Island, Lagos

### Leading with Data Analytics – Decision Analytics

Big data, business analytics and data science merits are only enabled by technology and should not be relegated to the specialists or IT professionals. They are leadership issues that executives need to address by properly getting practical knowledge and equipped with leadership-focused data analytics insight.

This master-class program delivers the fundamental concepts, solution techniques, modeling approaches, and applications of decision analytics. It aims at introducing participants to the most commonly used applied optimization, simulation and decision analysis techniques for prescriptive analytics in business. Participants will develop a contextual understanding of decision analytic techniques useful for providing leadership decision support.



# 2019/2020 Quarterly Data Science Master Class

# 05

## Course Outline

### Why Analytics is Every Leader's Problem

- Analytics Requires Managerial Judgment
- Analytics Requires Process and Incentive Changes
- Analytics Must be Problem-driven
- Analytics Must be Planned

### How to Build Organizational Muscle in Analytics

- Best Practice Case
- How to Organize for Analytics
- How to Manage Advanced Analytics Talent

### Applying Analytics to Your Business

- Presentations: Action Learning Projects
- Wrap-up: How Organisations Succeed Using Big Data and Analytics

### How a Working Knowledge of Data Science Drives Business Value: A Primer on Big Data and Analytics Concepts

- From Descriptions to Predictions
  - How Predictions Work
  - Exercise: Predictions
- From Predictions to Prescriptions and Actions
  - How To Tell Good Prescriptions from Bad Prescriptions
  - Predictions, Prescriptions, and the Problem of Causality
- The Power of Experimentation
  - Why Experiments Are the Foundation of Analytics
  - Exercise: Experimentation
  - Experimentation in Practice
  - How to Prescribe Without True Experiments
  - Exercise: Prescribing Without True Experiments
  - Optimizing with Analytics
- The Power of New Types of Data
  - Visualizing Analytics
  - Exercise: Visualization

## Course Details

### Date

TBD

### Time

9am – 4pm daily

### Fees

Contact us

### Venue

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17 Chief Yesufu Abiodun Way  
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Victoria Island, Lagos

### Artificial Intelligence and Deep Learning

Deep learning has yielded multiple successful artificial intelligence (AI) applications (search, vision, translation, drug synthesis, etc.), receiving major investments from leading global technology companies.

Deep learning uses both generative and descriptive methods, where generative models learn joint probability distributions and make Bayes-rule predictions, and descriptive models learn from training examples. Participants will learn which deep learning methods to select, based on dataset size, amount of known exemplars for training, classification granularity, and other factors. Participants will do individual project-based work (typically using R or another language of their choice) incorporating deep learning principles and practices, and will each select their own projects and datasets.

Topics will include the Deep Neural Networks, Hidden Markov Models, and other clustering and classification methods.

**Prerequisite:** Understanding of Regression and Multivariate Analysis

# Data Science Fast Track

# 06

## Beginners FastTrack



- Review of Key R or python functions
- Data Science fundamental I
- Introduction to Visualisation



- Data Science fundamentals II
- Introduction to modelling
- Linear Regression
- Logistic Regression
- Model Diagnostics
- Introduction to time series Modelling



### Pre-requisites

Basic understanding of R Language, any visualisation tool (PowerBI, Tableau, Qlik etc), Familiarity with excel functions, and application

### Date

TBD

### Time

9am – 4pm daily

### Fees

[Contact us](#)

### Venue

PwC Annexe  
17 Chief Yesufu Abiodun Way  
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Victoria Island, Lagos

## Beginners FastTrack



- Linear Algebra Overview
- Exploratory Data Analysis
- Linear Regression
- Multiple Linear Regression
- Regression Diagnostics
- Logistic Regression
- Statistics Assessments



- Scikit-learn
- Supervised and unsupervised learning
- Random Forest, SVM, clustering
- Dimensionality reduction
- Validation & evaluation of ML methods



### Pre-requisites

Evidence of ability on topics covered in Day 1 and Day 2 of the Intermediate 5-day course

### Date

TBD

### Time

9am – 4pm daily

### Fees

[Contact us](#)

### Venue

PwC Annexe  
17 Chief Yesufu Abiodun Way  
Oniru Estate  
Victoria Island, Lagos

# Data Science Fast Track

## 06

### Working with Unstructured Data

#### Mining unstructured data for business applications

- Preprocessing unstructured data in preparation for deeper analysis
- Describing a corpus of documents with a term-document matrix
- Make predictions from textual data

Duration (1 Day)

TBD

Time

9am – 4pm daily

Fees

Contact us

Venue

Pw C Annexe  
17 Chief Yesufu Abiodun Way  
Oniru Estate  
Victoria Island, Lagos

### Data Science Intermediate Course 01

#### Predicting Outcomes with Regression Techniques

Estimating future values with linear regression

- Modelling the numeric relationship between an output variable and several input variables
- Correctly interpreting coefficients of continuous data
- Assess your regression models for 'goodness of fit'

Duration (2 Days)

TBD

Time

9am – 4pm daily

Fees

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17 Chief Yesufu Abiodun Way  
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Victoria Island, Lagos

### Machine Learning FastTrack01

#### Categorizing Data with Classification Techniques

Automating the labelling of new data items

- Predicting target values using Decision Trees
- Constructing training and test data sets for predictive model building
- Dealing with issues of overfitting

#### Assessing model performance

- Evaluating classifiers with confusion matrices
- Calculating a model's error rate

Duration (2 Days)

TBD

Time

9am – 4pm daily

Fees

Contact us

Venue

Pw C Annexe, 17 Chief Yesufu Abiodun Way  
Oniru Estate, Victoria Island, Lagos

### Machine Learning FastTrack02

#### Detecting Patterns in Complex Data with Clustering and Social Network Analysis

Identifying previously unknown groupings within a data set

- Segmenting the customer market with the K-Means algorithm
- Defining similarity with appropriate distance measures
- Constructing tree-like clusters with hierarchical clustering
- Clustering text documents and tweets to aid understanding

#### Discovering connections with Link Analysis

- Capturing important connections with Social Network Analysis
- Exploring how social networks results are used in marketing

Duration (2 Days)

TBD

Time

9am – 4pm daily

### Advanced Analytics FastTrack 01

#### Advanced Analytics Techniques

- Advance probability with business applications
- Inferential statistics for decision making
- Model development and tuning for strategy development
- Multivariate methods
- Dimension reduction and Clustering methods
- Design and analysis of experiments in business and strategy
- Multivariate techniques for customer value management

Duration (2 Days)

TBD

Time

9am – 4pm daily

Fees

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Oniru Estate  
Victoria Island, Lagos

### Advanced Analytics FastTrack 02

#### Discovering drivers of business challenges, bottom-line, revenue, performance and profitability

Identifying significant business painpoints and business drivers

- Modelling the relationship between business performance indicators and business processes
- Evaluating impact of management decision on business performance
- Exploring marketing strategies impact on customer retention
- A/B testing
- Multivariate techniques for customer value management

#### Assessing model performance

- Evaluating classifiers with confusion matrices
- Calculating a model's error rate

Duration (2 Days)

TBD

Time

9am – 4pm daily

Fees

Contact us

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# Contacts



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You can reach us directly via  
[dataanalytics.academy@ng.pwc.com](mailto:dataanalytics.academy@ng.pwc.com)

#### About PwC

At PwC, our purpose is to build trust in society and solve important problems. We're a network of firms in 157 countries with more than 276,000 people who are committed to delivering quality in assurance, advisory and tax services. Find out more by visiting us at [www.pwc.com/ng](http://www.pwc.com/ng)

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