

# COMPUTATION MODELLING

## FOR BUSINESS INTELLIGENCE PROFESSIONALS

### DNA-106

Duration: 10 days; Instructor-led | Virtual Instructor-led

#### WHAT YOU WILL LEARN

This programme is created specifically for learners who wish to identify and utilise appropriate statistical algorithms and data models to test hypotheses and derive patterns or solutions.

#### Knowledge and Skills Acquired:

- Types of algorithms and advanced computational methods
- Range and application of various statistical algorithms
- Range and application of various types of data models
- Usage of analytics platforms and tools
- Statistical modelling techniques
- Coding languages for programming of algorithms and signals
- Potential reasons for unintended outcomes
- Identify appropriate statistical algorithms and data models to test hypotheses or theories
- Use appropriate analytics platforms and analytical tools given specific analytics and reporting requirements
- Utilise a range of statistical methods and analytics approaches to data
- Conduct statistical modelling of data to derive patterns and/or solutions
- Perform coding and configuration of software agents or programs based on a selected model or algorithm
- Conduct tests on the actions taken and outcomes to assess effectiveness of the model
- Diagnose unintended outcomes produced by analytical models
- Propose changes or updates to the model or algorithms applied
- Implement changes to the coding and configuration of software agents or programs
- Draw relevant trends and insights from data analysis to support decision

#### COURSE CONTENTS

#### MODULE 1: INTRODUCTION TO COMPUTATIONAL MODELLING FOR BI PROFESSIONALS

##### Topics:

- Introduction to advanced computational methods
- Discussion of analytic use cases
- Characteristics of statistical algorithm and data model requirements
- Assumptions and limitations of computational methods

##### Mapped to:

- K1 Types of algorithms and advanced computational methods
- K2 Range and application of various statistical algorithms
- K3 Range and application of various types of data models
- A1 Identify appropriate statistical algorithms and data models to test hypotheses or theories
- A3 Utilise a range of statistical methods and analytics approaches to data

#### Rationale for Sequencing of the Units

The first learning unit introduces learners to advanced computational methods. Learners are taught the various types of statistical algorithms, the characteristics and assumptions and limitations of computational methods. There is a discussion of analytic use cases, e.g. diagnostic analytics, clustering, prediction, network analysis, text analytics, image analytics, video analytics, modelling and simulation.

#### MODULE 2: TECHNOLOGY STRATEGY

##### Topics:

- Trends in analytic development and production platform
- Technology strategy for development and operation of analytics

##### Mapped to:

- K4 Usage of analytics platforms and tools
- A2 Use appropriate analytics platforms and analytical tools given specific analytics and reporting requirements

### Rationale for Sequencing of the Units

Subsequently, the next learning unit teaches learners technology strategy by first going through trends in analytic development and platform strategy.

The analytics platforms and analytical tools learners introduced to learners include R, SAS, Gretl, Orange. .

### MODULE 3: ADVANCED COMPUTATIONAL MODELLING DEVELOPMENT

#### Topics:

- Introduction to Statistical Modelling
- Introduction to Machine Learning Modelling
- Introduction to Time Series Forecasting Modelling

#### Mapped to:

- K5 Statistical modelling techniques
- A4 Conduct statistical modelling of data to derive patterns and/or solutions
- A6 Conduct tests on the actions taken and outcomes to assess effectiveness of the model
- A10 Draw relevant trends and insights from data analysis to support decisions

### Rationale for Sequencing of the Units

In the next learning unit, the learners move to the next step in the sequence where they are brought through statistical modelling techniques for machine learning, e.g.

- Supervised machine learning –decision tree
- Unsupervised machine learning –clustering

Learners work on exercises to practice Decision Tre, K-mean clustering, hierarchical clustering.

Range of Application:

- Machine Learning

### MODULE 4: ADVANCED COMPUTATIONAL MODELLING CODING

#### Topics:

- Data processing
- Data training and testing split
- Data sample balancing (optional)
- Model setting
- Model result report

#### Mapped to:

- K6 Coding languages for programming of algorithms and signals
- A5 Perform coding and configuration of software agents or programs based on a selected model or algorithm

- A8 Propose changes or updates to the model or algorithms applied
- A9 Implement changes to the coding and configuration of software agents or programs

### Rationale for Sequencing of the Units

In the next learning unit, the learners are taught data processing, data training and testing split, data sample balancing (optional), model setting and model result report.

The software agents or programs learners use include Python, R, Gretl, JMP, SAS, Orange.

### MODULE 5: POTENTIAL RISKS OF ANALYTICS MODEL

#### Topics:

- Unintended outcomes produced by analytical models and their potential reasons

#### Mapped to:

- K7 Potential reasons for unintended outcomes
- A7 Diagnose unintended outcomes produced by analytical models

### Rationale for Sequencing of the Units

The last learning unit teaches learners on potential risks of analytics models by looking at unintended outcomes, the potential reasons for unintended outcomes and how to diagnose various unintended outcomes.