Programme Outline

Date	Week	Module	Module Outcomes	Activities
July 24, 2020	Orientation Week	Programme Orientation	• Become familiar with the learning platform and the components of the programme	• Live session: Programme Introduction
July 31, 2020	Week 1	Introduction to Python, Analytics and Data Science	• Distinguish between descriptive, predictive and prescriptive analytics • Describe what data science is and its applications for your work/business • Describe the history and evolution of programming and Python • Discuss the benefits of Python and evaluate the demand and scope of Python in the industry • Explain the rules of coding and significance of coding readability using/referencing style guides • Identify objects and code variables in Python • Describe the data types in Python • Describe how to define strings using quotation marks and manipulate strings using operators	• Live session: Week 1 • **Required Activity 1.1: Knowledge Check** • Self-Study Discussion 1.2: Using Data Visualisation to Solve Business Problems
August 7, 2020	Week 2	Data Type Conversion and Control Flow	• Convert data between types to manipulate them • Describe various types of operators that return Boolean objects, including comparison, identity, membership and logic operators • Describe how Python's if-elif-else syntax and indentation structure work	• Live session: Week 2 • Self-Study Activity 2.1: Knowledge Check • Self-Study Assignment 2.2: Practising Methods of Strings

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			• Examine the concept of looping in Python through while loops and for loops • Evaluate the length of strings and apply indexing and slicing to them • Iterate characters via range and methods of strings	• **Required Assignment 2.3: Applying Python Control Flows**
August 14, 2020	Week 3	Working with Built-in Compound Data Types	• Compare and contrast lists and strings; discuss list methods and explain iteration and comprehension with lists • Describe the features of tuples and distinguish them from lists • Describe the features of dictionaries and distinguish them from lists • Distinguish between the parentheses used in Python	• Live session: Week 3 • **Required Assignment 3.1: Newsvendor Case**
August 21, 2020	Week 4	Functions, Methods and Packages	• Examine the categories and benefits of functions, discuss how to create a function and explain the use of function arguments • Describe modules, their benefits and how to import them • Install and use packages in Python • Describe the application of the Python package NumPy	• Live session: Week 4 • Self-Study Activity 4.1: Knowledge Check • **Required Assignment 4.1: Newsvendor Case - NumPy**

Date	Week	Module	Module Outcomes	Activities
August 28, 2020	Week 5	Data Manipulation and Analysis with Pandas	• Describe data representation and distinguish between numerical and categorical variables • Construct, index and slice a pandas.DataFrame • Use loc[] and iloc[] to access and modify subsets of a pandas.DataFrame • Filter data using Boolean pandas.Series and Boolean indexing	• Live session: Week 5 • Self-Study Activity 5.1: Knowledge Check • **Required Assignment 5.2: Case Study - Patient Arrivals in Singapore's Major Public Hospitals**
September 4, 2020	Week 6	Descriptive Analytics with Numerical Summary	• Use Pandas to obtain and interpret summary statistics, including mean, median, range and quartiles • Slice and dice data by applying group-wise operations such as aggregate, filter and apply functions in Pandas • Describe the application of different data visualisation Python packages: Matplotlib (main focus) and Seaborn	• Live session: Week 6 • Self-Study Activity 6.1: Knowledge Check • **Required Discussion 6.2: Applying Group-Wise Operations Using Pandas**
September 11, 2020	Week 7	Descriptive Analytics with Data Visualisation	• Derive insights from data by applying basic data visualisation techniques, such as histograms, box plots, bee swarm plots and violin plots • Determine the relationships between two or more variables using scatter plot, bubble plot • Visualise data including line charts and time series using Python libraries, Matplotlib and Seaborn	• Live session: Week 7 • Self-Study Assignment 7.1: Revisiting the Singapore Healthcare Case Study • **Required Assignment 7.2: Case Study - Condo Market in Singapore** • Week 8 Pre-read: Discrete and Continuous Variables

Date	Week	Module	Module Outcomes	Activities
September 18, 2020	Week 8	Foundation of Predictive Analytics	• Describe discrete and continuous random variables • Explain discrete and continuous random variables and their distributions, such as probability mass function and cumulative distribution function, using SciPy • Apply exponential distribution and normal distribution to business analytics problems/datasets using SciPy • Describe populations and samples • Estimate the population summary statistics using sample statistics • Use random variable simulation to perform decision analysis	• Live session: Week 8 • Self-Study Activity 8.1: Knowledge Check • Self-Study Discussion 8.2: Decision-Analysis Case Study - David's Decision Problem • **Required Assignment 8.3: Sampling Case Study - Monthly Salary Distribution of Taiwanese Employees**