Module Synopsis:

Specialist Diploma in Data Science (Predictive Analytics)

PDC 1: Post-Diploma Certificate in Fundamentals of Data Science (120 hours)

1. MS9001: Introduction to Statistics for Data Science (60 hours)

This module provides students with an introduction to elementary probability theory and statistical concepts and principles that lay the foundation to understand and learn the statistical procedures and methods in the subsequent modules. The topics covered include descriptive statistics, rules of probability, probability distributions of discrete and continuous random variables, sampling distributions, statistical estimation, and hypothesis testing.

Learning Objectives:

- Descriptive Statistics
- Probability and Probability Distributions
- Sampling Techniques & Sampling Distribution for Sample Mean
- Estimation of Population Mean (Confidence Interval)
- Hypothesis Testing of Means
- One-Way Analysis of Variance (ANOVA)
- Chi Square Test
- Simple Linear Regression

2. IT8701: Introduction to Programming for Data Science (60 hours)

This module provides students with the fundamental skills to code applications to retrieve, clean and visualize data using the Python programming language. Students learn key concepts such as what structured and unstructured data are, and how they can create and manipulate relational and NoSQL databases to explore data and to create visualizations that can help them gain useful insights from it.

Learning Objectives:

- To learn basic programming syntax such as variables/loops/if-else and data structures such as lists, dictionaries etc.
- To learn how to code Python applications for retrieving, transforming and visualizing data.
- To gain hands-on experience crafting data stories that support decision-making, using the output and visualizations generated by the Python programs.

Module Synopsis:

Specialist Diploma in Data Science (Predictive Analytics)

PDC 2: Post-Diploma Certificate in Predictive Analytics	**(120 hours)**
1. MS9008: Modelling Fundamentals & Statistical Learning	**(60 hours)**

This module introduces students to the essential concepts in modelling and statistical learning, providing a solid foundation for understanding and applying machine learning techniques. Topics covered include fundamental concepts in statistics and statistical learning, exploratory data analysis, data wrangling, and model evaluation. Students will also learn about simple and multiple linear regression. The module aims to equip students with the fundamentals needed to understand and perform effective data analysis and build predictive models using statistical methods and machine learning techniques.

2. MS9009: Machine Learning & Predictive Modelling	**(60 hours)**

This module provides an in-depth exploration of machine learning techniques and predictive modelling. Students will learn how to build predictive models for various types of data structures, with topics including time series analysis and modelling, logistic regression for categorical outcomes, k-nearest neighbours for classification and regression and tree-based methods for prediction. The module also delves into advanced topics such as regularization methods, ensemble learning, and resampling-and-simulation-based techniques. By the end of the module, students will have developed the skills to construct, assess and apply predictive models effectively in a wide range of data-driven contexts.