Business Mathematics and Statistics (Optional)

I.   Subject Overview and Objective

Banking and finance business transactions involve a large numbers of numerical calculations using mathematics and statistics. Product pricing and trading of funds especially require application of mathematics and statistics. Under new accounting standards and regulations on capital in banks, a lot of risk-modeling exercises is necessary for decision-making and determination of business strategies and risk values. Further, banking and financial institutions have to maintain a dedicated function of research on financial markets and investments that involves in quantitative techniques. However, financial mathematics and statistics are highly technical and complex that only mathematicians with a good background of finance can master. As a result, highly-paid banking and finance professions are dominated by mathematics experts and "financial engineering" subject has emerged in this field. Therefore, this subject is designed to provide knowledge only on basic principles and applications of mathematics and statistics in financial transactions and intended to familiarize banking and finance professionals on applications of mathematics and statistics in their businesses.

II. Recommended Subject Coverage

(a)   Introduction to Data Collection Methods: Data and Information, Types of Data, Sources of Data, Population & Sample, Sampling Methods

(b)   Presenting Data: Frequency Tables, Charts

(c)   Numerical Descriptive Measures: Central Tendency and Dispersion

(d)   Basic Probability: Introduction to Probability, Normal Distribution

(e)   Confidence Interval Estimation using Normal Distribution

(f)   Fundamentals of Hypothesis Testing: Introduction of Hypothesis Testing, Testing hypothesis where Sigma known

(g)   Linear Regression Analysis and Forecasting: Simple Linear Regression Model, Multiple Regression Model, Time Series Analysis and connected definitions and measures

(h)   Introduction to Modeling

(i)   Construction of Indices: Index Numbers of Quantity, Index Numbers of Price, Application of Indices and Issues

(j)   Selected Financial Applications: Bond pricing, estimation of yield curves, calculation of present value, expected rate of return on investment portfolios, Basel III Credit Risk Modeling, option pricing

(k)   Analytical Report Writing: A few case studies using statistical methods on topics relating to banking and financial services