KAPLAN PROFESSIONAL

Subject Outline

FIN201 Quantitative Applications in Finance

Section 1 — General information

1.1 Administrative details

Duration	Credit points	Level
One study period (12 weeks)	6	AQF8

1.2 Core or elective subject

This is an elective subject for the Graduate Certificate in Applied Finance, Graduate Diploma of Applied Finance and a core subject for the Master of Applied Finance.

1.3 Delivery mode

This subject is delivered online.

1.4 Prerequisites

There are no prerequisites for this subject. However please review the 'Assumed knowledge' section below to understand the prior knowledge Kaplan advises you should hold before enrolling in this subject.

1.5 Assumed knowledge

Whilst there are no prerequisites for this subject, Kaplan assumes that students have completed FIN101 Financial Markets and Economic Principles, FIN102 Regulation Ethics and Risk Management and FIN103 Financial Analysis and Valuation, or understand the content covered in those subjects, prior to undertaking FIN201 Quantitative Applications in Finance.

1.6 Course transition subject equivalence

Students may not be required to complete this subject if they have transitioned from a SIA/Finsia/Kaplan course and have completed the following subjects:

- FIN236 *Quantitative Applications in Finance*
- M01 *Quantitative Applications in Finance.*

1.7 Work integrated learning

There are no placements, internships or work experience requirements associated with undertaking this subject.

1.8 Other resource requirements

Students do not require access to specialist facilities and/or equipment to undertake this subject.

Section 2 — Academic details

2.1 Subject overview

This subject focuses on the underpinning quantitative concepts and techniques required in today's financial markets to interpret and forecast financial data. This firstly includes discussion of fundamental statistical concepts with specific reference to their financial application, and then explores hypothesis testing, linear regression and time-series analysis. It utilises these quantitative tools to assess elements in finance such as risk and return, asset pricing and portfolio construction.

Using the key data analysis and modelling techniques covered, students interpret various types of financial information, including economic, business and investment performance data, in order to develop practical quantitative strategies that may be applied in industry. Students also read and critique articles in financial journals, including validating methodologies and conclusions.

2.2 Subject learning outcomes

On successful completion of this subject, students should be able to:

1. Examine and apply the various quantitative techniques used to describe, estimate and evaluate data and interpret the results.
2. Conduct independent research and evaluate the strengths and limitations of statistical analysis techniques in finance.
3. Apply quantitative techniques to describe financial data and test claims of performance.
4. Analyse the factors that influence the risk and return of asset classes and financial securities.
5. Assess and interpret the results from statistical models used in estimating the value of financial assets and constructing efficient portfolios.
6. Apply spreadsheet applications to perform statistical analysis.

2.3 Topic learning outcomes

Topic 1: Fundamentals of quantitative applications

On successful completion of this topic, students should be able to:

- describe the importance of data and statistics in today's world of finance
- explain key concepts in statistics and probability
- calculate measures of central tendency
- calculate measures of dispersion
- calculate covariance and correlation between two random variables
- calculate expected value, variance and standard deviation for the sum of two random variables.

Topic 2: Probability distributions

On successful completion of this topic, students should be able to:

- explain probability distribution and distinguish discrete and continuous distribution
- interpret a probability function, a probability density function and a cumulative distribution function
- describe and interpret common discrete probability distributions such as the discrete uniform distribution and binomial distribution
- describe and interpret common continuous probability distributions such as the continuous uniform distribution, normal distribution and lognormal distribution
- calculate and interpret probabilities relating to a random variable given its probability distribution
- explain the key properties of the normal distribution and determine the probability that a normally distributed random variable lies inside a given interval
- define the standard normal distribution, explain how to standardise a random variable, and calculate and interpret probabilities using the standard normal distribution.

Topic 3: Sampling and estimation

On successful completion of this topic, students should be able to:

- define sampling techniques and the concept of sampling error and sampling distribution
- distinguish between point estimates and confidence intervals
- construct confidence intervals based on normal or student *t*-distributions.

Topic 4: Hypothesis testing

On successful completion of this topic, students should be able to:

- use hypothesis testing to evaluate population means, proportions and variances
- apply the principles of hypothesis testing in assessing the performance of investments
- recognise and apply ethical standards in hypothesis testing.

Topic 5: Correlation, covariance and causation

On successful completion of this topic, students should be able to:

- analyse the factors affecting financial instruments identifying which:
  - are significant
  - are positively or negatively interrelated
  - contribute to diversification
  - contribute to volatility.
- apply the statistical analyses of covariance, correlation and matrix algebra
- explain the strengths and weaknesses of the Pearson and Spearman rank correlations
- calculate the variance of a portfolio of many asset returns using the covariance matrix of asset returns
- explain the difference between causation, correlation and spurious correlation.

Topic 6: Regression

On successful completion of this topic, students should be able to:

- predict the future value of financial data by carrying out regression analysis (using Microsoft Excel) using both simple and multiple regressions
- explain the strengths and weaknesses of regression analysis
- describe the estimation and hypothesis testing using regression models
- describe the methods for detecting and correcting violations of the simple linear regression model
- describe the methods of detecting factors affecting predictions.

Topic 7: Time-series analysis

On successful completion of this topic, students should be able to:

- discuss how time-series analysis is used in finance
- explain the different models used in time-series analysis
- determine which time-series model will produce superior forecasts in a particular circumstance.

Topic 8: Risk and return

On successful completion of this topic, students should be able to:

- analyse the risk and return of a portfolio using the chi-squared test
- describe the calculation of the Markowitz efficient frontier for investment
- explain the difference between diversifiable and systematic risk, and calculate the systematic risk (beta)
- assess investment manager/analyst skills using statistical analysis, including the use of a range of ratios
- describe the use of contribution analysis and performance attribution in identifying generators of value and analysing fund performance
- describe the use of benchmarks in measuring fund performance.

Topic 9: Asset pricing models

On successful completion of this topic, students should be able to:

- describe the methods of analysing risk using factor models
- explain the time-series approach of macroeconomic models
- explain the cross-sectional approach of fundamental models
- apply an illustrative multi-factor model to calculate a portfolio's total risk and tracking error
- describe the use of the CAPM to calculate market risk (beta)
- explain the difference between structural and statistical APT models of forecasting, and the different types of each model.

Topic 10: Optimisation and portfolio construction

On successful completion of this topic, students should be able to:

- describe the statistical techniques used in optimising the construction of a portfolio
- apply the mathematical program procedure in Microsoft Excel (Solver) to develop optimal portfolios with non-linear constraints
- describe the procedure for using genetic algorithms in combinatorial optimisation.

2.4 Assessment schedule

Assessment	Description	Week	Topics	Weighting	Subject learning outcomes assessed
Task	Short-answer questions based on a given scenario	Week 4	1–3	20%	LO1, LO2
Assignment 1	Short-answer, calculation and excel based questions in response to a given scenario.	Week 7	1–5	30%	LO1–LO3, LO6
Quiz	Multiple-choice questions	Week 10	1–6	10%	LO1–LO4
Assignment 2	Short-answer and excel based modelling questions	Week 12	4–10	40%	LO1–LO6

Please refer to our website www.kaplanprofessional.edu.au to review student policies relating to your assessment, including the Kaplan *Assessment Policy* and *Academic Integrity and Conduct Policy.*

2.5 Prescribed text

There is no prescribed text for this subject. Students are provided with key readings and access to Kaplan's online databases. Students are encouraged to research and read widely on the topic.

2.6 Study plan

Week(s)	Topic name	Study load in hours
1	Topic 1: Fundamentals of quantitative applications	7
2	Topic 2: Probability distributions	8
3	Topic 3: Sampling and estimation	15
4	**Task (Weighting 20%)** Topic 4: Hypothesis testing	10
5	Topic 5: Correlation, covariance and causation	8
6	Topic 6: Regression	15
7	**Assignment 1 (Weighting 30%)** Topic 7: Time-series analysis	10
8	Topic 8: Risk and return	10
9	Topic 9: Asset pricing models	10
10	**Quiz (Weighting 10%)** Topic 10: Optimisation and portfolio construction	12
11–12	**Assignment 2 (Weighting 40%)**	15
Total minimum study load		**120 hours**

Additional recommended personal study hours (may be required for concept review or additional research)	50 hours
Total recommended study load	**170 hours**