H8TSFA: Time Series & Financial Analytics

Module Code:	H8TSFA
Long Title	Time Series & Financial Analytics APPROVED
Title	Time Series & Financial Analytics
Module Level:	LEVEL 8
EQF Level:	6
EHEA Level:	First Cycle
Credits:	10
Module Coordinator:	TONY DELANEY
Module Author:	TONY DELANEY
Departments:	School of Computing
Specifications of the qualifications and experience required of staff	Masters' Degree or PhD in a computing or cognate discipline. May have industry experience also.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
#	**Learning Outcome Description**
LO1	Analyse time series using appropriate techniques.
LO2	Compare and contrast alternative models to assist with forecasting.
LO3	Source data ethically and communicate forecasts in a comprehensive and professional manner.
LO4	Apply forecasting techniques to data exhibiting heteroscedacity.
LO5	Implement quantitative techniques to optimise portfolios, measure performance and value financial assets .
LO6	Evaluate the role of data analytic approaches in Financial Markets.

Dependencies	
Module Recommendations	
No recommendations listed	
Co-requisite Modules	
No Co-requisite modules listed	
Entry requirements	Learners should have attained the knowledge, skills and competence gained from stage 3 of the BSc (Hons) in Data Science

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Module Content & Assessment

Indicative Content

Introduction to Time Series Concepts
Decomposition of Time Series. Adjusting for Inflation. Stationarity. Data Transformations. Ethical data sourcing

Fundamental Time Series Concepts
Mean & Linear Trend models. Random Walk Models. Averaging & smoothing models

Regression Models with Time Series
Regression models with time series.

ARIMA models I
Non-seasonal ARIMA models. Orders of AR and MA terms. Model estimation

ARIMA models II
Seasonal ARIMA models. Identifying a suitable model

Autoregressive Conditional Heteroscedacticity I
ARCH (1).

Autoregressive Conditional Heteroscedacticity II
GARCH models.

Portfolio Optimisation
Markowitz portfolio theory. Portfolio risk and return. The diversification effect. Measuring Beta

Performance Measurement in Investment Markets
Performance and risk. Sharpe Index. Treynor's Measure. Jensen's Measure. Information Ratio

Financial Indices
Construction of stock market indices. Construction of price indices.

Discounted cash flow models
DCF and bond valuation. Dividend discount models. Relative valuation of equities.

Data Analytic approaches to Financial Markets
Quantitative and high frequency trading. Big data and risk assessment

Assessment Breakdown	%
Coursework	40.00%
End of Module Assessment	60.00%

Assessments

Full Time

Coursework

Assessment Type:	Formative Assessment	% of total:	Non-Marked
Assessment Date:	n/a	Outcome addressed:	1,2,3,4,5,6
Non-Marked:	Yes		

Assessment Description:
Formative assessment will be undertaken utilising exercises and short answer questions during certain tutorials. In class discussions will be undertaken on contemporary topics. Feedback will be provided individually or as a group in oral format.

Assessment Type:	Continuous Assessment	% of total:	40
Assessment Date:	n/a	Outcome addressed:	1,3,4
Non-Marked:	No		

Assessment Description:
Learners will be asked to source financial data and undertake a significant forecasting exercise using time series techniques. The project will assess practical application relating to LO1, LO3 and LO4 Project data should be sourced in an ethical manner and application made for ethical approval where required in accordance with School policy

End of Module Assessment

Assessment Type:	Terminal Exam	% of total:	60
Assessment Date:	End-of-Semester	Outcome addressed:	1,2,3,4,5,6
Non-Marked:	No		

Assessment Description:
The examination will be in the region of two hours in duration and may include a mix of: theoretical, applied and interpretation questions. Assessment of LO1, LO3 and LO4 will cover theoretical and conceptual dimensions

No Workplace Assessment

Reassessment Requirement

Repeat examination
Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

Reassessment Description
The repeat strategy for this module is an examination. All learning outcomes will be assessed in the repeat exam.

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Module Workload				
Module Target Workload Hours 0 Hours				
Workload: Full Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Classroom & Demonstrations (hours)	24	Per Semester	2.00
Tutorial	Other hours (Practical/Tutorial)	24	Per Semester	2.00
Independent Learning	Independent learning (hours)	202	Per Semester	16.83
			Total Weekly Contact Hours	4.00

Module Resources

Recommended Book Resources

Hyndman, R. & Athanasopoulos, G.. (2017), Forecasting: Principles and Practice 2e, O Texts.

Tsay, R.S.. (2013), An Introduction to analysis of financial data with R, Wiley, New York.

DeFusco, R., McLeavey, D., Pinto, J. & Runkle, D.. (2015), Quantitative Investment Analysis, Wiley, New Jersey.

Supplementary Book Resources

Brooks, C.. (2008), Introductory Econometrics for Finance (2nd ed), Cambridge University Press, Cambridge.

This module does not have any article/paper resources

This module does not have any other resources

Discussion Note: