AFIN7015

Financial Data Science

Session 1, Online-scheduled-weekday 2022

Department of Applied Finance

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General Information

Unit convenor and teaching staff
Unit Convenor
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Credit points
10

Prerequisites
Admission to Master of Research

Corequisites

Co-badged status

Unit description
This unit introduces the fundamental process of data science for finance to students with an interest in the rapidly growing area of FinTech. The unit focuses on developing critical computational, statistical, and other contemporary analytical skills that are essential for people conducting the data-driven financial analytics in the FinTech area. Students will practice their learned concepts and analytical skills through applied data-driven case studies in selected data intensive domains in finance such as financial data management and visualisation, financial risk analysis and prediction, consumer analytics, trading etc.

Financial Data Science is a course with an emphasis on applied learning informed by strong theoretical foundation. The lectures combine discussion on contemporary methods in data science such as Regression and Classification methods, Data Management and Visualisation methods, clustering, Machine Learning methods etc., with worked examples using real data. Students will use computer terminals with access to Excel and programming tools such as SQL, R, Python etc, and industry standard financial databases.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Prepare a critically appraised review of core predictive and classification methods in financial data science research.

ULO2: Evaluate and apply data analytics skills using computer software tools to solve real-world problems in the finance industry.

ULO3: Apply working knowledge of advanced methods in financial data science to extract and report insights from financial data in various forms.

General Assessment Information

Late submissions of assessments

Unless a Special Consideration request has been submitted and approved, no extensions will be granted. There will be a deduction of 10% of the total available assessment-task marks made from the total awarded mark for each 24-hour period or part thereof that the submission is late. Late submissions will only be accepted up to 96 hours after the due date and time.

No late submissions will be accepted for timed assessments – e.g., quizzes, online tests.

Table 1: Penalty calculation based on submission time

Submission time after the due date (including weekends)	Penalty (% of available assessment task mark)	Example: for a non-timed assessment task marked out of 30
< 24 hours	10%	10% x 30 marks = 3-mark deduction
24-48 hours	20%	20% x 30 marks = 6-mark deduction
48-72 hours	30%	30% x 30 marks = 9-mark deduction
72-96 hours	40%	40% x 30 marks = 12-mark deduction
> 96 hours	100%	Assignment won't be accepted

Other assessment criteria for assessment tasks will be provided on the unit iLearn site.

Assessment Tasks

Name	Weighting	Hurdle	Due
Online Quiz	5%	No	Week 3
Financial Data Analysis 1	40%	No	Week 6
Financial Data Analysis 2	55%	No	Week 11

Online Quiz

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 2 hours
Due: **Week 3**
Weighting: **5%**

The online quiz will consist of 5 to 10 multiple choice and/or short answer questions and will be available on iLearn. Please use the quiz result as an indicator of whether you are progressing satisfactorily in the unit.

On successful completion you will be able to:

- Prepare a critically appraised review of core predictive and classification methods in financial data science research.

Financial Data Analysis 1

Assessment Type [1]: Project
Indicative Time on Task [2]: 25 hours
Due: **Week 6**
Weighting: **40%**

Students will be required to analyse real world financial data sets using relevant descriptive statistics and visualisation techniques.

On successful completion you will be able to:

- Prepare a critically appraised review of core predictive and classification methods in financial data science research.
- Evaluate and apply data analytics skills using computer software tools to solve real-world problems in the finance industry.

Financial Data Analysis 2

Assessment Type [1]: Project
Indicative Time on Task [2]: 30 hours
Due: **Week 11**
Weighting: **55%**

Students will review core predictive and classification methods in financial data science research and conduct quantitative and qualitative analysis using data science tools and techniques, and present their findings

On successful completion you will be able to:

- Prepare a critically appraised review of core predictive and classification methods in financial data science research.
- Apply working knowledge of advanced methods in financial data science to extract and report insights from financial data in various forms.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Required Text:	The unit will utilise various library resources, including research papers, book chapters, case studies etc., and relevant material will be made available on ilearn.
Unit Web Page:	Log in via https:iLearn
Technology Used and Required:	**Necessary technology**: Computer with R and RStudio software, Excel, internet access. Useful technology: The unit will utilise the R software but the MATLAB and Python software environment are also very useful if you intend doing this sort of work professionally.
Delivery Format and Other Details:	**Teaching and Learning Activities** The teaching in the unit will be interactive case study style delivery where financial data science classification and predictive methods will be discussed along with hands on examples using R. You are strongly advised to attempt all examples before the weekly lectures, and before consulting the solutions. You are encouraged to submit your workings of the class examples for further feedback.

Recommended Readings:	We will supplement the lecture materials with readings from journals and other textbooks. A list of relevant material will be provided on iLearn site. Following are some of the recommended readings: • Lantz, B. (2019). Machine Learning with R: Expert Techniques for Predictive Modeling, 3rd Edition (3rd ed.. ed.): Birmingham: Packt Publishing, Limited. • Boehmke, P. D. B. C. (2016). Data Wrangling with R. Cham: Cham: Springer International Publishing. • Pathak, M. A. (2014). *Beginning data science with R*: Springer. • Nolan, D., & Lang, D. T. (2015). *Data Science in R* (1 ed.). • John, M., & Nina, Z. (2014). *Practical Data Science with R, Second Edition*: Manning Publications. • Chinnamgari, S. (2019). *R Machine Learning Projects* (1 ed.): Packt Publishing. • Mathur, P. (2019). *Machine Learning Applications Using Python: Cases Studies from Healthcare, Retail, and Finance*. Berkeley, CA: Berkeley, CA: Apress. • Nataraj, D., Ricardo Anjoleto, F., & Vitor Bianchi, L. (2018). *Hands-On Data Science with R*: Packt Publishing. • Dayal, V. (2020). *Quantitative Economics with R : A Data Science Approach / by Vikram Dayal* (1st ed. 2020. ed.): Singapore : Springer Singapore : Imprint: Springer. • Simon, W. (2016). *Big Data Analytics with R*: Packt Publishing. • Mailund, T. (2017). *Beginning Data Science in R: Data Analysis, Visualization, and Modelling for the Data Scientist*. Berkeley, CA: Berkeley, CA: Apress. • Choe, G., & Springer International Publishing Ag. (2016). *Stochastic analysis for finance with simulations* (Universitext). • Singh, A., & Allen, David E. (2017). R in finance and economics : A beginner's guide / Abhay Kumar Singh, David Edmund Allen.

Unit Schedule

Please refer to iLearn.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.e

du.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support

- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Changes since First Published

Date	Description
03/02/2022	Co-taught with AFIN8015