AFIN7015

Financial Data Science

Session 1, Special circumstances 2021

Department of Applied Finance

Contents

Notice

As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to timetable viewer. To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff
Unit Convenor
Abhay Singh
abhay.singh@mq.edu.au

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

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

It is the responsibility of students to view their marks for each within-session-assessment on iLearn within 20 days of posting. If there are any discrepancies, students must contact the unit convenor immediately. Failure to do so will mean that queries received after the release of final results regarding assessment tasks (not including the final exam mark) will not be addressed.

Late submissions and extensions

Tasks 10% or less – No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for special consideration is made and approved.

Tasks above 10% - No extensions will be granted. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late (for example, 25 hours late in submission – 20% penalty). This penalty does not apply for cases in which an application for special consideration is made and approved. No submission will be accepted after solutions have been posted.

Assessment Tasks

Name	Weighting	Hurdle	Due
Online Quiz	5%	No	Week 3
Financial Data Analysis 1	35%	No	Week 6
Financial Data Analysis 2	60%	No	Week 12

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: **35%**

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 12**
Weighting: **60%**

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.mq.edu.au
Technology Used and Required:	**Necessary technology**: Computer with MS Excel, R and RStudio software, scientific or business calculator without alphanumeric capabilities, 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:	**Classes** A typical class will be structured as recorded lecture(s) and a live lecture with hands on example. The two parts will mostly flow together and not separately. Please feel free to ask (and answer!) questions throughout the class. Attendance at the live sessions is expected. **Teaching and Learning Activities** The teaching in the unit will be interactive case study style delivery where financial modelling and forecasting 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.

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
- Grade Appeal Policy
- Complaint Management 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.edu.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

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise
- 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

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

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
08/02/2021	Unit is co-taught with AFIN8015