Annexe A: New/Revised Course Content in OBTL+ Format

Course Overview

The sections shown on this interface are based on the templates [UG OBTL+](#) or [PG OBTL+](#)

If you are revising/duplicating an existing course and do not see the pre-filled contents you expect in the subsequent sections e.g. Course Aims, Intended Learning Outcomes etc. please refer to [Data Transformation Status](#) for more information.

Expected Implementation in Academic Year	AY2024-2025
Semester/Trimester/Others (specify approx. Start/End date)	Semester 2
Course Author * Faculty proposing/revising the course	Wenjun Zhu
Course Author Email	wjzhu@ntu.edu.sg
Course Title	Financial and Risk Analytics II
Course Code	BR3214
Academic Units	3
Contact Hours	39
Research Experience Components	

Course Requisites (if applicable)

Pre-requisites	BR2211 Financial and Risk Analytics I
Co-requisites	
Pre-requisite to	
Mutually exclusive to	
Replacement course to	
Remarks (if any)	

Course Aims

As a continuation of BR2211, this course aims to introduce advanced data analytics models in the context of finance and risk management. It discusses how these models work, how and when they can be used, and how they should be interpreted, exemplified with real-world applications, such as predicting insurance losses, assessing credit quality, etc. At the end of the course, you will be able to apply various data analytics techniques to solve practical problems in finance and risk management. The course uses the open-source software R.

Course's Intended Learning Outcomes (ILOs)

Upon the successful completion of this course, you (student) would be able to:

	ILO 1	Describe various data analytic models
	ILO 2	Formulate business problems in the data analytic framework
	ILO 3	Analyse real-world datasets with data analytic techniques
	ILO 4	Evaluate the performance of different data analytic models
	ILO 5	Explain the results of different data analytic models

Course Content

- Regression: linear and generalized linear models, nonlinear models

- Classification

- Resampling and cross-validation

- Model selection and regularization

- Tree-based models: decision tree, random forests, and boosting

- Support vector machines

- Neural networks

- Unsupervised learning

- Portfolio selection

- Case study

Reading and References (if applicable)

Basic Text

Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani. An Introduction to Statistical

Learning with Applications in R/Python, Second Edition, 2021.

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	Introduction	1,2	Chapters 1-2		
2	Regression	1-5	Chapter 3		
3	Portfolio Selection & CAPM	1-5	Handouts		
4	Classification	1-5	Chapter 4		
5	Resampling and Cross-validation	1-5	Chapter 5		
6	Model Selection and Regularization	1-5	Chapter 6		
7	Quiz 1	1-5	NA		
8	Nonlinear Models	1-5	Chapter 7		
9	Tree-based Models	1-5	Chapter 8		
10	Deep learning	1-5	Chapter 10		
11	Unsupervised Learning	1-5	Chapter 12		
12	Quiz 2	1-5	NA		
13	Course Project Presentation	1-5	NA		

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Lectures	The interactive lecture session explains key concepts in detail, supported by illustrating examples. The lectures provide ample opportunities for open discussion on the conceptual questions raised in the class, which allow you to think critically and share your ideas with the class. The interaction between the instructor and the entire class ensures that the targeted learning outcomes can be achieved.
In-Class activities	Interactions are encouraged in class to enhance critical thinking and class engagement. Instant feedback will be provided to in-class participation to ensure the learning goals can be attained.

Assessment Structure

Assessment Components (includes both continuous and summative assessment)

No.	Component	ILO	Related PLO or Accreditation	Weightage	Team/Individual	Rubrics	Level of Understanding
1	Continuous Assessment (CA): Test/Quiz(Quiz 1)	ILO1-5	Critical Thinking, Acquisition of Knowledge	25	Individual		
2	Continuous Assessment (CA): Test/Quiz(Quiz 2)	ILO1-5	Critical Thinking, Acquisition of Knowledge	25	Individual		
3	Continuous Assessment (CA): Project(Individual project (written report and in-class presentation)*)	ILO1-5	Problem Solving and Decision-making, Acquisition of Knowledge, Oral & Written Communication	40	Individual		
4	Continuous Assessment (CA): Class Participation(Class participation)	ILO1-5	Critical Thinking, Oral Communication	10	Individual		

Description of Assessment Components (if applicable)

* You will complete a project that involves real-world datasets. The marks will be based on the report and the presentation.

Formative Feedback

You will receive verbal feedback from me about your presentations. You will receive summative feedback on the quizzes and project following the conclusion of the module.

NTU Graduate Attributes/Competency Mapping

This course intends to develop the following graduate attributes and competencies (maximum 5 most relevant)

Attributes/Competency	Level

Course Policy

Policy (Academic Integrity)

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values. As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information. On the use of technological tools (such as Generative AI tools), different courses / assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Policy (General)

You are expected to complete all assigned pre-class readings and activities, attend all seminar classes punctually and take all scheduled assignments and tests by due dates. You are expected to take responsibility to follow up with course notes, assignments and course related announcements for seminar sessions they have missed. You are expected to participate in all seminar discussions and activities.

Policy (Absenteeism)

Absence from class without a valid reason will affect your overall course grade. Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies.

If you miss a lecture, you must inform the course instructor via email prior to the start of the class.

Policy (Others, if applicable)

Policy on GenAI

You may use generative artificial intelligence (AI) for research in developing your assignments. It is mandatory that you check the accuracy of the information provided by the generative AI by citing the actual sources of that information. No generative AI tool may be cited as your sources of that information. If you have employed any generative AI in your research, you must furnish a declaration at the end of your submission that acknowledges such usage, i.e., "I declare that I did use generative AI in my research for this submission."

The written assignment should demonstrate your own analysis based on the requirements of the assignments. You are not permitted to use generative AI tools to complete your assignments. Generative AI detection tools will be used to check for plagiarism. Please ensure each assignment that you submit is truly your own work. Academic disciplinary action will be taken if you are found to use generative AI returns in verbatim to complete your course assignments.

Consult the academic integrity website and your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

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