

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	
Semester/Trimester/Others (specify approx. Start/End date)	
Course Author * Faculty proposing/revising the course	Ciyu Nie
Course Author Email	cynie@ntu.edu.sg
Course Title	Financial and Risk Analytics I
Course Code	BR2211
Academic Units	0
Contact Hours	3
Research Experience Components	

Course Requisites (if applicable)

Pre-requisites	AB1202 Statistics and Analysis
Co-requisites	
Pre-requisite to	
Mutually exclusive to	
Replacement course to	
Remarks (if any)	

Course Aims

This course aims to provide an overview of data analytics application under financial, insurance and risk management context. In particular, it provides a holistic view of how data analytics affects the insurance and risk management decision making procedure. You will gain skills to design a good data analytic framework, be able to perform data modellings and calibrate appropriate model to serve specific financial planning and risk management tasks. You will be able to use different simulation methods and generate scenarios for stress testing and risk analysis.

Course's Intended Learning Outcomes (ILOs)

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

ILO 1	Describe the data analysis framework that can be applied in the finance, insurance and risk management practices;
ILO 2	Describe and apply the principles of data wrangling, with special focus on financial/ insurance data processing;
ILO 3	Perform modelling using Regression, Clustering and basic Machine learning methods;
ILO 4	Perform appropriate model calibration, including fitness testing, back testing, bootstrapping and other model validation methods;
ILO 5	Perform simulations and construct appropriate scenario generator for stress testing and other use cases;
ILO 6	Describe the existing and potential data analytic solutions in finance, insurance and risk management.

Course Content

1. Data-analytic thinking and its application in finance, insurance and risk management; 2. Principles of data wrangling and data preparation; 3. Data modelling: Regression techniques, Machine learning, Clustering 4. Model calibration: Underfitting and overfitting, Evidence and probabilities, Visualizing model performance, Back testing, Bootstrapping and other Model validation methods 5. Simulation methods: the basics, constructing scenario generator and stress testing 6. Finance, insurance and risk management tasks with data analytic solutions (case studies)

Reading and References (if applicable)

Connor Carreras, Jeffrey Heer, Joseph M. Hellerstein, Sean Kandel, and Tye Rattenbury. Principles of Data Wrangling. O'Reilly Media, Inc, 2017. Chen, Ding-Geng (Din), and Jenny K Chen. Statistical Regression Modeling with R: Longitudinal and Multi-Level Modeling. Cham: Springer International Publishing AG, 2021. Kordon, Arthur K. Applying Data Science: How to Create Value with Artificial Intelligence. Cham: Springer International Publishing AG, 2020. Additional handouts prepared. Data science for business : [what you need to know about data mining and data-analytic thinking], by Foster Provost and Tom Fawcett

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
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Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Seminars	The interactive seminar session where there is ample opportunities for open discussion on the conceptual questions raised in the class allows you to think critical and share their ideas and concept with the class. This also allows me to get the concepts clearly through the entire class by involving you and ensure that the targeted learning outcomes are being achieved
In-Class activities	Some learning outcomes for this course are skills which are practical in nature and cannot be achieved by reading and writing. The achievement of such learning outcomes requires hands-on experience, in-class activities provide such opportunities.

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	Summative Assessment (EXAM): Final exam()	1-6	Critical Thinking, Acquisition of knowledge	45	Individual		
2	Continuous Assessment (CA): Test/Quiz(Coursework: midterm quiz)	1-3	Critical Thinking, Acquisition of knowledge	20	Individual		
3	Continuous Assessment (CA): Report/Case study(Coursework: Case Study project and in-class presentation)	1-6	Teamwork & Interpersonal skills, Oral communication, Problem Solving & Decision-Making, Critical Thinking	25	Team		
4	Continuous Assessment (CA): Class Participation(Coursework: class participation)	1-6	oral communication	10	Individual		

Description of Assessment Components (if applicable)

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Formative Feedback

You will receive verbal feedback from me about your presentations, as well as in-class discussion. You will receive summative group feedback on the exam 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
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Course Policy

Policy (Academic Integrity)

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Policy (General)

(1) General

You are expected to complete all assigned pre-class readings and activities (e.g. tutorial questions provided), 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)

(2) 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)

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Last Updated By: Lim Zu An