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 1
Course Author * Faculty proposing/revising the course	Adam Shao
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Course Title	Quantitative Analysis
Course Code	BR2207
Academic Units	3
Contact Hours	39
Research Experience Components	

Course Requisites (if applicable)

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

Course Aims

This course covers basic knowledge in probability and statistics, regression and simulation. This course draws on applications from a variety of areas where risk analysis and data analytics have become important. Some of these applications include financial risk management, insurance risk management, corporate risk management and personal financial planning. The purpose of the course is to equip students with right mindsets and necessary knowledge and skillsets of completing Quantitative Analysis in the GARP FRM® Exam Part I.

Course's Intended Learning Outcomes (ILOs)

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

ILO 1	Analyse exploratory data and summary statistics with appropriate tools
ILO 2	Use univariate distributions to calculate probabilities, quantiles and moments
ILO 3	Use joint distributions to calculate probabilities, quantiles and moments
ILO 4	Calculate conditional expectations and conditional probabilities
ILO 5	Explain the concepts of random sampling, statistical inference and sampling distribution
ILO 6	Apply methods of estimation to point estimation
ILO 7	Construct an appropriate null hypothesis and alternative hypothesis and distinguish between the two.
ILO 8	Conduct goodness-of-fit test
ILO 9	Describe the relationship between a t-statistic, its p-value and a confidence interval.
ILO 10	Use regression model to analyze data
ILO 11	Construct, apply and interpret hypothesis tests and confidence intervals for regression coefficient(s) in a regression model.
ILO 12	Describe the basic steps to conduct a Monte Carlo simulation.
ILO 13	Describe the disadvantages of the simulation approach to financial problem solving.

Course Content

- Discrete and continuous probability distributions
- Estimating the parameters of distributions
- Population and sample statistics
- Bayesian analysis
- Statistical inference and hypothesis testing
- Measures of correlation
- Linear regression with single and multiple regressors
- Simulation methods

Reading and References (if applicable)

Basic Text M&M: Miller, I. and M. Miller, John E. Freund's Mathematical Statistics with Applications, 8-Edition, 2014. Other supplementary notes will be posted in NTUlearn.

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	Review Exploratory Data Analysis & Probability Random Variables & Distributions	1-2	Chapters 1, 2, 3	In-person	
2	oint Distributions, Mathematical Expectation	3-4	Chapters 3,4	In-person	
3	Some Discrete Probability Distributions Some Continuous Probability Densities	2-3	Chapters 5,6	In-person	
4	Functions of Random Variables	3-4	Chapter 7	In-person	
5	Sampling Distributions & the Central Limit Theorem	5	Chapter 8	In-person	
6	Statistical Inference: Point & Interval Estimations	6-7	Chapters 10, 11	In-person	
7	(Mid-term Test) Hypothesis Testing & Goodness of Fit	7-8, 9	Chapters 12, 13	In-person	
8	Recess				

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
9	Regression & Correlation Analysis of Variance	10-11	Chapters 14, 15	In-person	
10	Regression & Correlation Analysis of Variance	10-11	Chapters 14, 15	In-person	
11	Simulation	12-13	Handout	In-person	
12	Class Presentation			In-person	
13	Review			In-person	

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Seminars	Key concepts introduced in this module will be explained in detail in the seminars supported with examples and exercises. The seminars provide opportunities for open discussion on the conceptual questions, which allow you to think critically and share your ideas with the class. The seminars involve the interaction between the instructor and the entire class, making sure that the targeted learning outcomes could be successfully achieved.
Assignments	The assignments require you to generate, analyze and deliver materials in a guided manner.
In-Class activities	Interactions are encouraged in class to enhance critical thinking and class engagement. We will use the “interactive classroom response system” to provide instant feedback to your understanding and learning of the course material, thereby ensuring the learning goals/objectives are 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	Summative Assessment (EXAM): Final exam()	ILO1-13	Acquisition of knowledge & Problem Solving	45	Individual		
2	Continuous Assessment (CA): Test/Quiz(Midterm)	ILO1-7	Acquisition of knowledge & Problem Solving	20	Individual		
3	Continuous Assessment (CA): Assignment()	ILO1-13	Acquisition of knowledge & Problem Solving	15	Individual		
4	Continuous Assessment (CA): Class Participation()	ILO1-13	Oral Communication & Critical Thinking	10	Individual		
5	Continuous Assessment (CA): Presentation(class presentation)	ILO1-13	Oral Communication & Critical Thinking	10	Individual		

Description of Assessment Components (if applicable)

Formative Feedback

Feedback is central to this course. In addition to receiving feedback on your coursework: assignments and midterm, we will also rely on the “interactive classroom response system” via Kahoot to provide instant feedback to you and to evaluate your in-class participation.

NTU Graduate Attributes/Competency Mapping

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

Attributes/Competency	Level
Communication	Intermediate
Decision Making	Intermediate
Problem Solving	Basic
Sense Making	Intermediate
Critical Thinking	Basic

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)

No Food
You are not allowed to bring food in the classroom. You may have a meal during breaks.

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Last Updated By: Teo Chew Yen