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	Joey Zhou
Course Author Email	joey.zhou@ntu.edu.sg
Course Title	Satistical Modelling
Course Code	BA2203
Academic Units	4
Contact Hours	52
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 provides an in-depth background knowledge in probability and statistics. It covers the necessary concepts and techniques in probability and statistics as well as the development of underlying theory. This course draws on applications from a variety of areas where risk analysis has become important including finance, insurance, actuarial science, corporate risk managementand personal financial planning.

Course's Intended Learning Outcomes (ILOs)

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

ILO 1	Use univariate distributions to calculate probabilities, quantiles and moments
ILO 2	Use joint distributions to calculate probabilities, quantiles and moments
ILO 3	Calculate conditional expectations and conditional probabilities
ILO 4	Explain the concepts of random sampling, statistical inference and sampling distribution
ILO 5	Analyse exploratory data and summary statistics with appropriate tools
ILO 6	Apply methods of estimation to point estimation
ILO 7	Construct confidence intervals for unknown parameters
ILO 8	Conduct hypothesis test and goodness-of-fit test
ILO 9	Use regression model to analyze data
ILO 10	Use R for problem solving and data analysis

Course Content

- Exploratory Data Analysis
- Probability Distributions & Probability Densities (Univariate & Multivariate)
- Mathematical Expectation
- Generating Functions
- Compound Distribution
- Functions of Random Variables
- Sampling Distributions
- Statistical Inference: Point & Interval Estimations
- Hypothesis Testing & Goodness of Fit
- Regression & Correlation Analysis
- Analysis of Variance

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 Resources ActEd Study Materials: Subject CS1, The Actuarial Education Company.

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	Review; Exploratory Data Analysis & Probability; Random Variables & Distributions	ILO1, ILO5	Basic Text Chapters 1, 2	In-person	
2	Joint Distributions	ILO2	Chapter 3	In-person	
3	Mathematical Expectation, Generating Functions, Compound Distribution	ILO3	Chapter 4	In-person	
4	Some Discrete Probability Distributions Some Continuous Probability Densities	ILO1-3, ILO10	Chapters 5, 6	In-person	
5	Some Discrete Probability Distributions Some Continuous Probability Densities	ILO1-3, ILO10	Chapters 5, 6	In-person	
6	Functions of Random Variables	ILO1-3	Chapter 7	In-person	
7	Sampling Distributions & the Central Limit Theorem	ILO4	Chapter 8	In-person	
8	Recess				

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
9	Statistical Inference: Point & Interval Estimations	ILO6-7, ILO10	Chapters 10, 11	In-person	
10	Hypothesis Testing & Goodness of Fit	ILO8, ILO10	Chapters 12, 13	In-person	
11	Regression & Correlation Analysis; Analysis of Variance	ILO9-10	Chapters 14, 15	In-person	
12	Regression & Correlation Analysis; Analysis of Variance	ILO9-10	Chapters 14, 15	In-person	
13	Presentation				

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.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.
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(Final Examination)	ILO1-9	Acquisition of knowledge & Problem Solving	70	Individual		
2	Continuous Assessment (CA): Test/Quiz(Midterm)	ILO1-5	Acquisition of knowledge & Problem Solving	10	Individual		
3	Continuous Assessment (CA): Class Participation(Class participation)	ILO1-10	Oral Communication & Critical Thinking	10	Individual		
4	Continuous Assessment (CA): Class Participation(Class presentation)	ILO1-10	Oral Communication & Critical Thinking	10	Individual		

Description of Assessment Components (if applicable)

** The 70% weightage for final is required by the accreditation agreement with the IFOA

***The presentation should provide highlights related to an academic study, government report, or media coverage about a topic of common interests, broadly construed. Suggested presentation components to be included:
1) Brief background introduction
2) What is the sample and/or analysis done?
3) Summary of findings or conclusion from the statistics.
You are encouraged to include critiques and/or some reflections if you find any. Note that the main assessment point of this assignment is on the presentation itself. Thus, you are advised to focus on the plot, design, and style, rather than statistical technicalities. See Appendix C for the assessment criteria.

Formative Feedback

Feedback is central to this course. In addition to receiving feedback on your midterm, we will also rely on the “interactive classroom response system” via Kahoot to provide instant feedback to you and to evaluate your inclass 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	Intermediate
Sense Making	Intermediate
Critical Thinking	Intermediate

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)

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Last Updated By: Tan Shin Lu