

Course Outline

FN211 Financial Mathematics and Statistics

Semester 2/2022 (January 9 - May 6, 2023)

Number of Credit: 3 credits (3-0-6)

Prerequisite: -

General Information:

This class develops background in mathematics and statistics that are crucial for study in corporate financial decision making and investments. The first half of the class introduces building blocks in calculus whereas the second half tackles the mathematical concepts of time value of money, probability, statistics, and matrix algebra.

Course Description:

Essentials of statistics and mathematics for financial applications: basic statistics, the concept of risk and return, probability, regression analyses, basic calculus (e.g. introduction to derivatives, integration, and integral), optimization, and basic matrices.

Course Objectives:

1. Acquaint students with the financial mathematics tools necessary for assessment of risk and return in financial decision making and investment management.
2. Learn techniques to organize and analyze data.
3. Develop scientific thinking and overcome anxiety about applying calculus and statistics in finance work.
4. Develop familiarity with use of excel statistics functions.

Class Time and Logistic

Class day: Tuesday

Class time: 2.00 – 5.00 PM

Venue: Room 202, 2nd floor, Faculty of Economics

Teaching Materials Platform: Google Classroom <https://kmutt.me/211class222>

Instructor:

Name: Dr. Winai Homsombat
Office Hours: By appointment
Email: winai_be@econ.tu.ac.th

Expected Learning Outcomes FN211

1. Morality and Ethics

Applicability	Expected Learning Outcomes	Evaluation Method
N/A	1. Possess honesty, sacrifice, self-social, and environmental responsibility.	
N/A	2. Value “sufficiency” theory and adapt it in life path by adhering to adequacy, rationale, and immunity development.	
●	3. Value disciplines, respect, and comply with the rules and regulations of the institution and society at large.	Class participation
N/A	4. Acquire knowledge related to business morality and ethics, and be able to handle ethical dilemma with integrity.	

2. Knowledge

Applicability	Expected Learning Outcomes	Evaluation Method
N/A	1. Acquire knowledge on and understand the important concepts in business management.	
●	2. Acquire knowledge on and understand the important social and science concepts related to business management.	Assignment and Examination
N/A	3. Acquire knowledge on and understand the important concepts related to business processes, planning, corporate structures, operations, control, performance evaluation and contingency plan to suit the circumstances.	
N/A	4. Acquire the knowledge on academic advancement and professional development in business management including the understanding of the situational adaptability and its impacts on business.	

3. Intellectual Development

Applicability	Expected Learning Outcomes	Evaluation Method
●	1. Be able to search and process information and utilize various concepts appropriately in a given circumstance in order to obtain relevant information to benefit in the rapidly changing business environment.	Assignment and Examination

Applicability	Expected Learning Outcomes	Evaluation Method
N/A	2. Be able to think systematically, rationally and creatively and to integrate knowledge from other disciplines to solve the problems in business and other settings.	
N/A	3. Be able to collectively propose solutions to problems at hand and analyze the impacts of the proposed solutions and be able to choose the solution that is appropriate to a given situation to ensure business competitive advantages.	

4. Interpersonal Skills and Responsibilities

Applicability	Expected Learning Outcomes	Evaluation Method
●	1. Be able to work in team, possess interpersonal skills and leadership skills, and be professionally adaptive to a given situation.	Class participation and Assignment
N/A	2. Be creative and constructively criticize to solve problem of the team.	
N/A	3. Be responsible in lifelong learning to develop self and professional career.	

5. Quantitative Analysis, Communication and Information Technology

Applicability	Expected Learning Outcomes	Evaluation Method
●	1. Be able to apply mathematics, statistics, quantitative analysis in analyzing and making decisions in business and daily life.	Assignment and Examination
N/A	2. Be able to efficiently communicate in Thai and foreign languages that are relevant in doing Business.	
N/A	3. Be able to explain the issues and make the issues clear in verbal or writing, and be able to choose the appropriate pattern of communication for different groups of audience both in business context and in other contexts.	
N/A	4. Be able to utilize the information technologies or others to support the business operations.	

Remark: ● Primary expected outcome ○ Secondary expected

Main Text:

- Wackerly, D.D., Mendenhall III, W., and Scheaffer, R.L. (2002). Mathematical Statistics with Applications. 6th ed. Thomson Learning.
- Stewart, J. (2016). Calculus. 8th ed. Thomson Brooks/Cole.

Recommended Texts & Materials

- Anderson, D.R., Sweeney, D.J., Williams, T.A., Camm, J.D., and Cochran, J.J. (2017). Statistics for Business and Economics. Thirteenth Edition. Cengage Learning.
- Ruppert, D. (2011). Statistics and data analysis for financial engineering (Vol. 13). New York: Springer.
- Miller, M. B. (2013). Mathematics and statistics for financial risk management. John Wiley & Sons.

Grading Criteria:

The course grades will be based on two exams (individual performance) and homework or quizzes (individual performance). Grading scheme is as follows.

Class participation	10%
Quiz and Assignment	20%
Mid-term examination	30%
Final examination	40%

Type of evaluation	Evaluation Method	Evaluation date
Class participation and Assignment	Written assignment or quiz (Essay questions)	During Week 1-15
Mid-term	Examination	Tuesday, February 28, 2023; 15.00 - 17.00 hrs.
Final	Examination	Friday, May 12, 2023; 09.00 - 12.00 hrs.

Class policies:

1. Lectures will stress the most important issues addressed in the readings. You are responsible for all material covered in class and assigned readings. Lectures may go beyond the scope of the textbook. Therefore, it is important for you to attend and participate in class.
2. There will be assignments as deemed appropriate to accommodate effective learning. Each assignment will be graded based on the quality of the analysis and the ability to apply the principles of financial management for managerial decision. Lecture notes, exercises, and guided solution to each lecture, as well as other useful materials, could be accessible from class Moodle.

3. You are responsible for all announcements and changes made in class. However, there will be no make- up quiz and final examination without prior consent from the instructor. If a student has a legitimate, verifiable reason (e.g., doctor's note), a separate comprehensive examination will be given.

Tentative Class Schedule:

Week	Content
1	Review of basic statistics and calculus
2	Discrete Random Variables and Their Probability Distributions - Basic Definition and the probability Distribution for a Discrete Random Variable - The Expected Value of a Random Variable or a Function of a Random Variable - The Binomial Probability Distribution
4 – 5	Continuous Random Variables and Their Probability Distributions - Introduction and The Probability Distribution for a Continuous Random Variable - Expected Values for Continuous Random Variables - The Uniform Probability Distribution - The Normal Probability Distribution - Other Expected Values
6 – 7	Multivariate Probability Distributions - Introduction - Bivariate and Multivariate Probability Distributions - Marginal and Conditional Probability Distributions - Independent Random Variables - The Expected Value - The Variance and Covariance of Two Random Variables - The Multinomial Probability Distribution - Conditional Expectations
Mid term Exam: Tuesday, February 28, 2023; 15.00 - 17.00 hrs.	
8 – 9	Risk and Return - Asset Return and Risk - Introduction to VaR
10 – 11	Basic Matrices - Matrix Notation - Matrix Operations - Vector Spaces - Applications
12 – 13	Regression Analyses - Simple Regression - Multiple Regression - Applications

Week	Content
14 – 15	Optimization - Constrained Optimization - Unconstrained Optimization - Applications
	Final Exam: Friday, May 12, 2023; 09.00 - 12.00 hrs.

Important Date:

Semester 2/2022 (January 9 - May 6, 2023)	
Registration at REG TU (*ID.62-65)	November 22 – 25, 2022
Tuition Fee Payment Period (Via TU Greats App)	November 27, 2022 – January 7, 2023
Classes Begin	January 9, 2023
Add-drop period	January 9 - 22, 2023 <i>(from 9.00 AM of January 9 to 10.30 PM of January 22)</i>
Tuition Fee Payment Period (Via TU Greats App)	January 9 - 23, 2023 <i>(9 AM - 10.30 PM)</i>
Mid-term Examination Period	February 27 - 28 to March 4, 2023
<i>Makha Bucha Day*</i>	<i>March 6, 2023</i>
Withdrawal period with "W" on record	January 25 – March 19, 2023 <i>(from 9.00 AM of January 25 to 10.30 PM of March 19)</i>
<i>Chakri Memorial Day*</i>	<i>April 6, 2023</i>
<i>Songkran Festival Day*</i>	<i>April 10 - 16, 2023</i>
<i>Coronation Day*</i>	<i>May 4, 2023</i>
Last day of class for Semester 2/2022	May 6, 2023
Final exam period	May 8 – 22, 2023
<i>Royal Ploughing Ceremony Day*</i>	<i>To be announced</i>
Submitting Forms for Degree Conferral	January 9 - 22, 2023

*Remark * Holiday, No classes during this period*