Course Outline

FN211 Financial Mathematics and Statistics

Semester 1/2020 (August 10 - November 28, 2020)

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

Lecture Time: Saturday, 09.00 – 12.00 hrs.

Lecture Venue: Room 206, Faculty of Economics

Instructor: Dr. Winai Homsombat

Email: winai.hom@mail.kmutt.ac.th

Office hours: by appointment

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

Prerequisites: -

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.

Main Text:

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

Other Recommended Book:

1. 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.
2. Ruppert, D. (2011). Statistics and data analysis for financial engineering (Vol. 13). New York: Springer.
3. Miller, M. B. (2013). Mathematics and statistics for financial risk management. John Wiley & Sons.

Grading Policy:

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

1. Mid term Examination 35% **(Saturday, October 3, 2020: 09.00 - 11.00 hrs.)**
2. Final Examination 45% **(Tuesday, December 8, 2020, 09.00 – 12.00 hrs.)**
3. Homework or Quizzes 20%

Evaluation Methods

Type of evaluation	Evaluation Method	Evaluation date
Homework or Quizzes	Written assignment or quiz (Essay questions)	During Week 1 – Week 15
Midterm Examination	Written exam (Closed book, essay questions)	Saturday, October 3, 2020 Time: 09.00 - 11.00 hrs.
Final Examination	Written exam (Closed book, essay questions)	Tuesday, December 8, 2020 Time: 09.00 – 12.00 hrs.

Teaching Plans:

Week	Content
1	Review of basic statistics and calculus
2 – 3	**Discrete Random Variables and Their Probability Distributions** - Basic Definition - 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 - The Geometric Probability Distribution - The Negative Binomial Probability Distribution - The Hypergeometric Probability Distribution - The Poisson Probability Distribution - Moments and Moment-Generating Functions (Optional)
4 – 5	**Continuous Random Variables and Their Probability Distributions** - Introduction - The Probability Distribution for a Continuous Random Variable - Expected Values for Continuous Random Variables - The Uniform Probability Distribution - The Normal Probability Distribution - The Gamma Probability Distribution - The Beta 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 of a Function of Random Variables - Special Theorems - The Covariance of Two Random Variables - The Expected Value and Variance of Linear Functions of Random Variables - The Multinomial Probability Distribution - Conditional Expectations
	Midterm Exam (Saturday, October 3, 2020: 09.00 - 11.00 hrs.)
8 – 9	Risk and Return - Asset Return - Risk - Introduction to VaR
10 – 11	Basic Matrices - Matrix Notation - Matrix Operations - Vector Spaces - Applications
12 – 13	Regression Analyses - Simple Regression - Multiple Regression - Applications
14 – 15	Optimization - Constrained Optimization - Unconstrained Optimization - Applications
	Final Exam (Tuesday, December 8, 2020, 09.00 – 12.00 hrs.)

ACADEMIC CALENDAR & HOLIDAY

Semester 1/2020

(August 10 - November 28, 2020)

Semester 1/2020 (August 10 – November 28, 2020)	
Classes Begin	August 10, 2020
Add-drop period	August 10 – 23, 2020
Tuition payment period	August 10 – 24, 2020
*H.M. Queen Sirikit The Queen Mother's Birthday**	*August 12, 2020*
Mid-term Examination Period	September 28 – October 3, 2020
Withdrawal period with "W" on record	October 12 – November 15, 2020
*H.M. King Bhumibol Adulyadej The Great Memorial Day **	*October 13, 2020*
*King Chulalongkorn's Day**	*'October 23, 2020*
Last day of class for Semester 2/2019	November 28, 2020
Final exam period	November 30 – December 16, 2020
*H.M. King Bhumibol Adulyadej The Great's Birthday**	*December 5, 2020*
*Substitution for H.M. King Bhumibol Adulyadej The Great's Birthday**	*December 7, 2020*
*Constitution Day**	*December 10, 2020*

Remark * Holiday, No classes during this period

CONTACT INFORMATION

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