

## Course Outline

### FN211 Financial Mathematics and Statistics

Semester 2/2020 (January 20 - May 19, 2021)

<b>Number of credits:</b>	3 credits (3-0-6)
<b>Lecture Time:</b>	Saturday, 09.00 – 12.00 hrs.
<b>Lecture Venue:</b>	Room 101, Ground floor, Faculty of Economics or Online Platform
<b>Instructor:</b>	Dr. Winai Homsombat
	Email: <a href="mailto:winai.hom@mail.kmutt.ac.th">winai.hom@mail.kmutt.ac.th</a>
	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*. 6<sup>th</sup> 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 30% (Saturday, March 13, 2021; 09.00-11.00 AM)
2. Final Examination 30% (Friday, May 21, 2021; 09.00 AM-12.00 (noon))
3. Homework or Quizzes 40%

### 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	Take-Home Examination	Saturday, March 13, 2021; 09.00-11.00 AM
Final Examination	Take-Home Examination	Friday, May 21, 2021; 09.00 AM-12.00 (noon)

Tentative Teaching Plans:

Week	Content
1	Review of basic statistics and calculus
2 – 3	<b>Discrete Random Variables and Their Probability Distributions</b> <ul style="list-style-type: none"> <li>- Basic Definition</li> <li>- The probability Distribution for a Discrete Random Variable</li> <li>- The Expected Value of a Random Variable or a Function of a Random Variable</li> <li>- The Binomial Probability Distribution</li> </ul>
4 – 5	<b>Continuous Random Variables and Their Probability Distributions</b> <ul style="list-style-type: none"> <li>- Introduction</li> <li>- The Probability Distribution for a Continuous Random Variable</li> <li>- Expected Values for Continuous Random Variables</li> <li>- The Uniform Probability Distribution</li> <li>- The Normal Probability Distribution</li> <li>- Other Expected Values</li> </ul>
6 – 7	<b>Multivariate Probability Distributions</b> <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Bivariate and Multivariate Probability Distributions</li> <li>- Marginal and Conditional Probability Distributions</li> <li>- Independent Random Variables</li> <li>- The Expected Value</li> <li>- The Variance and Covariance of Two Random Variables</li> <li>- The Multinomial Probability Distribution</li> <li>- Conditional Expectations</li> </ul>
<b>Midterm Exam:</b> <b>Saturday, March 13, 2021; 09.00-11.00 AM</b>	
8 – 9	Risk and Return <ul style="list-style-type: none"> <li>- Asset Return</li> <li>- Risk</li> <li>- Introduction to VaR</li> </ul>
10 – 11	Basic Matrices <ul style="list-style-type: none"> <li>- Matrix Notation</li> <li>- Matrix Operations</li> <li>- Vector Spaces</li> <li>- Applications</li> </ul>
12 – 13	Regression Analyses <ul style="list-style-type: none"> <li>- Simple Regression</li> <li>- Multiple Regression</li> <li>- Applications</li> </ul>
14 – 15	Optimization <ul style="list-style-type: none"> <li>- Constrained Optimization</li> <li>- Unconstrained Optimization</li> <li>- Applications</li> </ul>
<b>Final Exam:</b> <b>Friday, May 21, 2021; 09.00 AM-12.00 (noon)</b>	

## ACADEMIC CALENDAR & HOLIDAY

Semester 2/2020

Semester 2/2020 (January 20 - May 19, 2021)

<b>Semester 2/2020 (January 20 - May 19, 2021)</b>	
Classes Begin	January 20, 2021
Add-drop period	January 25 - 29, 2021
Tuition payment period	January 30 - February 2, 2021
<i>Makha Bucha Day*</i>	<i>February 26, 2021</i>
Mid-term Examination Period	March 10 - 16, 2021
Withdrawal period with "W" on record	March 24 - May 6, 2021
<i>Chakri Memorial Day*</i>	<i>April 6, 2021</i>
<i>Songkran Day Festival*</i>	<i>April 12 - 18, 2021</i>
<i>Substitution for Visakha Bucha Day*</i>	<i>April 26, 2021</i>
<i>Coronation Day*</i>	<i>May 4, 2021</i>
<i>Royal Ploughing Ceremony Day*</i>	<i>May 11, 2021</i>
Last day of class for Semester 2/2019	May 19, 2021
Final exam period	May 20 - June 5, 2021
<i>Visakha Bucha Day*</i>	<i>May 26, 2021</i>
<i>Queen Suthida's Birthday*</i>	<i>June 3, 2021</i>

*\* Public Holiday, No Classes During this Period*

### CONTACT INFORMATION

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