

## Quantitative Making Decision

BUS/MAT-366 ID3963

Class meetings: two times per week

Instructor: Urmambetov Bakyt.

Office Hours: W, F: 11.00-13.00 , or by appointment.

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Prerequisites: Mathematical analysis 1. Theory of probabilities and mathematical statistics.

### Course Content

1. This course focuses on the connection between real life problems and making decision. Students will learn how to model real life problems, formulate real life problems and study of the quantitative methods for decision making, in particular the application of mathematical and statistical models in the analysis of problems related to economic and business. The main topic includes probability and decision making analysis, analysis under uncertain conditions, theory of portfolio: The Markowitz and Tobin portfolio theories.

2. Course aim is to teach students to construct models and make decision.

3. Learning outcomes:

- Midterm Exam 40%
- Final Exam 50%
- Homework 5%
- Class participation 5%
- Midterm exam date: Tentatively set for October 27, 2017.
- Final exam date: Saturday, December 16, 2017.
- Homework: At the conclusion of each module is homework assignment. You may work in small groups of up to 3 students on the homework exercises.
- Participation: This includes participation in class experiments and collaborative learning exercises.

4. Assessment Tasks/Activities. Home exercises, class works.

5. Course instructor reserves the right to modify any and all portions of this syllabus at any time during the period of the course.

6. Students should do all home exercises on time.

7. The use of cell phones (talking, texting, etc.) during class is strictly prohibited. Students violating this policy will be given one (1) warning. A second violation of this policy will result in the student being counted absent for the class.

The use of any other electronic devices (SUCH AS LAPTOP, IPADS) during class for any purpose not related to the furtherance of the class objectives is strictly prohibited. Students violating this policy will be given one (1) warning. A second violation of this policy will result in the student being counted absent for the class.

The Academic Honesty Code states “I will be honest in all my academic activities and will not tolerate dishonesty”

8. Grading Scale:

**$0 \leq F \leq 40 < D \leq 45 < C- \leq 50 < C \leq 60 < C+ \leq 65 < B- \leq 70 < B \leq 80 < B+ \leq 85 < A- \leq 90 < A \leq 100.$**

Course Schedule:

Week 1. Introduction to Quantitative Making Decision. Examples of making decision problems.

Decision strategies. The conservative strategy. The gambler strategy. Maximizing expected payoff.

Week 2. Sensitivity analysis. Evaluating risk.

Week 3. Expected Value of Perfect Information. Decision tree and Bayes' rule. Using Bayes' rules to maximize profits.

Week 4. Deriving the posterior probabilities. Consultant predictions. Evaluating consulting information.

Week 5-8. Time series analysis. Additive and multiplicative structures. Components of a time series. Centered moving average. Computing a seasonal index. Measuring trend, seasonality.

Week 9. Choosing the optimal portfolio. Stocks and bond.

Week 10. The Markowitz Portfolio Theory. Portfolio of Multiple Assets. Mean and variance of the portfolio. Covariance matrix.

Week 11. Optimal Portfolio Selection. Minimizing risk.

Week 12. Optimal Portfolio Selection. Maximizing expected return.

Week 13. The Tobin model. Minimizing risk with a risk free asset.

Week 14. Maximizing expected return with a risk free asset. CAPM.

Week 15. Preparation to final exam.

Textbooks

(1) Introduction to business statistics. Alan H. Kvanli. West publishing company.

(2) Markowitz H. M., Mean Variance Analysis in Portfolio Choice and Capital Markets. Basil. Blackwell. 1990

(3) Методы принятия решения. М.Эддоус, Р.Стэнсфилд. ЮНИТИ, 1997.