Course unit: Models and Decisions

Beware! Under construction.

Course metadata

- Title in French: Modèles et Décisions
- Course code: tba
- ECTS credits: 8
- Type: ground course
- Teaching hours: 100h
- Period: September to mid-November
- Language of instruction: English and French
- Coordinator: tba
- Instructor(s): Mitra Fouladirad, Christophe Pouet, Jiakun Zheng, Dominique Henriet, Clément Depoutre (BNP Paribas), Gaël Leboeuf (Aix-Marseille Université)
- *Last update 23/07/2025 by C. Pouet*

Brief description

This course unit is divided into four parts:

- **Risk and decision** (24 hours) taught by Dominique Henriet, Jiakun Zheng and Clément Depoutre
- **Statistics and decisions** (24 hours) taught by Mitra Fouladirad and Christophe Pouet
- **Corporate finance** (24 hours) taught by Gaël Leboeuf
- **Data project: business issues understanding** (20 hours) taught by tba

Learning outcomes

- Understand how economic agents take decision under uncertainty
- Learn how to assess risk and how to compare risky situations
- Learn how to model, estimate and predict time series
- Financial statement reading and analysis
- Capital budgeting
- Understanding capital structure

Course content

Risk and decision

1. Part 1 - Risk and Expected Utility
    1. Introduction: diversification and mutualization
    2. Risk measures
        1. Risk magnitude: cumulative distribution and quantile function

        2. Risk measures based on the quantile function, the actuarial approach
        3. Risk measures based on CDF, the expected utility approach
    3. Expected utility
        1. Risk Aversion in the expected utility approach
        2. The measure of risk aversion
        3. The characteristics of risk aversion
2. Part 2 - Behavioral decision making
    1. Decision under risk
        1. Introduction to Expected Utility Theory, Risk Aversion and Measurement
        2. Behavioral Decision Theories under Risk
    2. Decision under uncertainty
        1. Eliciting Beliefs in Economics
        2. Multiple Priors and Ambiguity
    3. Time preferences
        1. Discounted Utility Theory: Time versus Risk
        2. Hyperbolic Discounting and Its Measurement
3. Part 3 - Introduction to financial risk management
    1. Risk management in banks
    2. Market risks
    3. Counterparty risks

Statistics and decisions

1. Reminder on probability: conditional expectation
2. Stochastic processes in discrete and continuous time
3. ARMA process: definition, existence, characteristics (autocovariance, partial autocovariance)
4. Estimation of ARMA processes: identification, parameters estimation and validation
5. Extensions: SARIMA, ARCH and GARCH processes

Corporate finance

1. The Corporation
2. Introduction to Financial Statements Analysis
3. Financial Decision Making and the Law of One Price
4. The Time Value of Money
5. Investment Decision Rules
6. Fundamentals of Capital Budgeting
7. Capital Markets and The Pricing of Risk
8. Optimal Portfolio Choice and the Capital Asset Pricing Model
9. Estimatong the Cost of Capital
10. Capital Structure in a Perfect Market
11. Mergers and Acquisitiions

Data Project: business issues understanding

tba

Bibliography

You can check the availability of the books below at Centrale Méditerranée library.

1. Risk and decision
    - course ebook
    - Gollier, C., Schlesinger, H. and Eeckhoudt, L. (2005). Economic and Financial Decisions Under Risk. Princeton University Press
    - Wakker, P. P. (2010). Prospect Theory: For Risk and Ambiguity. Cambridge university press.
    - Carvalho, A. (2016). An overview of applications of proper scoring rules. Decision Analysis, 13(4), 223-242.
2. Statistics and decisions
    - course handout
    - Brockwell, P.J. and Davis, R.A. (1991). Time Series: Theory and Methods. Second Edition. New York: Springer Verlag.
    - Box, J.E.P. and Jenkins, G.M. (1970). Time Series Analysis; Forecasting and Control. San Francisco: Holden Day.
3. Corporate finance
    - Berk, J. and DeMarzo, P. (2019) Corporate finance. Prentice Hall; 5th edition.
    - Useful websites
        - Aswath Damodaran at NYU: Course and video materials, formulas, spreadsheets, estimated risk premium, Cost of capital by sector and more.
        - AMF. Annual reports and legal informations on French listed companies.
        - Yahoo! Finance. Financial data on listed companies.