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27C01000 Business Decisions 1 (6 cr)

Responsible teacher: Juuso Liesiö

Status of the Course: Bachelor's programme, Specialization area in Information and Service Management, elective

Level of the Course: Bachelor's level course

Teaching period:

Period II (2018-2019) Otaniemi campus

Period II (2019-2020) Otaniemi campus

Workload: Contact teaching 36h, individual work 121h, exam 3h. Total 160h (ECTS).

Learning Outcomes: Management Science deals with the use of analytical models to help make better business decisions. This course focuses on optimization models that are commonly used in business applications. After the course the student can (i) recognize the types of real-life business decision problems where use of the models brings added value, (ii) interpret results of these models to derive defensible decision recommendations, and (iii) build and solve these models using spreadsheets to support business decision making.

Content: Linear programming, network and distribution models, integer linear programming, mixed-integer linear programming, non-linear programming.

Assessment Methods and Criteria: Assignments 50%, exam 50%.

Study Material: Lecture slides, articles, assignments, computer implementations of mathematical models, and the textbook (An Introduction to Management Science by Anderson et al., 2014, ISBN Code: 978-1-111-82361-0).

Course Homepage: <https://mycourses.aalto.fi/course/search.php?search=27C01000>

Prerequisites: Basic knowledge on multivariate equations and functions.

Evaluation: 0-5

Registration for Courses: Via WebOodi

Language of Instruction: English

Further Information: A maximum of 100 students will be admitted to the course. Priority will be given to Aalto ISM students.

30C00355 Business Mathematics II (6 cr)

Responsible teacher: Panu Erästö

Status of the Course: Bachelor's programme, Specialization area in Information and Service Management, elective

Level of the Course: Bachelor's level course

Teaching period: Period V (2018-2019) Otaniemi campus Period V (2019-2020) Otaniemi campus

Workload: Lectures 30h, individual work 132 h.

Learning Outcomes: On this course, the student improves his/her skills in applying mathematical methods and tools to solve business problems, and obtains theoretical foundations for reading advanced finance and management science literature. After the course, the student will understand the basics of mathematical reasoning. He/she will also be able to build optimization models and solve them by using Excel.

Content: Euclidian spaces, sets and relations, logic, theorems and proofs, convex functions and sets, basics of linear, integer, and nonlinear optimization, stochastic modeling (time permitting).

Assessment Methods and Criteria: Final exam 40 % and homework assignments 60%.

Study Material: Lecture slides, assignments

Substitutes for Courses: 30C003500 Mathematics II, 30C00300 Mathematical Methods for economists

Course Homepage: <https://mycourses.aalto.fi/course/search.php?search=30C00355>

Prerequisites: 30A03000 Introduction to business mathematics or an equivalent course

Evaluation: 0-5

Registration for Courses: Via WebOodi

Language of Instruction: English

Further Information: Only one of the courses 30C003500 Mathematics II, 30C00300 Mathematical Methods for economists and 30C00355 Business Mathematics can be completed

30C02000 Negotiation Analytics (6 cr)

Responsible teacher: Jyrki Wallenius

Status of the Course: Bachelor's programme, Specialization area in Information and Service Management, elective

Level of the Course: Bachelor's level.

Teaching period: Period V (2018-2019) Otaniemi campus Period V (2019-2020) Otaniemi campus

Workload: - Contact teaching (16h)

- Supervised case sessions (12h)

- Independent work (129h)

- Exam (3h)

Total 160h (6 ECTS)

Learning Outcomes: The student has developed an awareness of negotiations and of himself/herself as a negotiator. He/she will master concepts and tools for preparing for negotiations and conducting negotiations. The student understands how to learn from his/her own negotiation experiences.

Content: Fundamentals of negotiations:

- game theory, decision analysis, behavioral decision theory

Two-party win-lose negotiations

- making concessions, hardball tactics

Two-party win-win negotiations

- scoring system

External help

- mediation, arbitration, facilitation

Many party negotiations

Assessment Methods and Criteria: 50% exam

50% three case studies

Study Material: Professor's PP-slides (posted in my courses)

Textbook (in part): H. Raiffa, J. Richardson, D. Metcalfe: Negotiation Analysis, Belknap Press, 2007 (or equivalent)

Substitutes for Courses: 27C02000 Negotiation Processes Upon professor's approval

Course Homepage: <https://mycourses.aalto.fi/course/search.php?search=30C02000>

Prerequisites: Recommended: Business Decisions I

Evaluation: 0-5

Registration for Courses: via Weboodi

Language of Instruction: English

Further Information: 80 students, first come first served. Students in the ISM bachelors program and Finance bachelors program have priority.

30C00200 Econometrics (6 cr)

Responsible teacher: Timo Kuosmanen

Status of the Course:

Bachelor's programme, Specialization area in Information and Service Management, elective

Minor in Quantitative Methods, elective

AALTO course

Level of the Course: Bachelor's level course

Teaching period: III Spring (2018-2019) Otaniemi campus III Spring (2019-2020) Otaniemi campus

Workload: Lectures 36 h

Exercise sessions 10 h

Self-study and other independent work 74 h

Exam preparation 37 h

Exam 3 h

Total 160 h (6 ECTS)

Learning Outcomes: The main objective of the course is to obtain a basic understanding of the econometric methodology. The aim is to motivate the students to examine causal relationships between economic phenomena by using a linear regression model. The course focuses on least squares estimation of the model and related statistical inferences. The assumptions of least squares estimation will be critically investigated. We examine the violations of these assumptions and the possible ways to alleviate the assumptions. The emphasis of the course is in the empirical application of the least squares method and its extensions. The economic interpretation of the estimated parameters of regression model and their statistical significance is given a special focus. After the course, students should have the skills to conduct basic empirical econometric analysis.

Content: Econometrics is a branch of economics that aims to give empirical content to economic theory by applying statistical methods to real world data. This course focuses on the application of linear regression to economic data, its assumptions, and statistical significance tests of parameters and linear restrictions. We also extend the basic linear regression for modeling endogeneity, heteroskedasticity and autocorrelation. Time series and panel data models are considered towards the end of the course. All topics are examined by means of economic examples with actual empirical data.

Assessment Methods and Criteria: 70 % exam

30 % assignments

Study Material: Lecture notes and additional material are provided on the course website.

The following textbooks may be used as supplementary study material:

Wooldridge, J.M. (2009) Introductory econometrics: A modern approach. (or any newer edition)

Dougherty, Christopher (2007) Introduction to econometrics. (or any newer edition)

Course Homepage: <https://mycourses.aalto.fi/course/search.php?search=30C00200>

Prerequisites: At least 30A02000 Tilastotieteen perusteet or an equivalent introductory statistics course.

Evaluation: 0-5

Registration for Courses: Via WebOodi.

Language of Instruction: English

27E02000 Models in Marketing (6 cr)

Responsible teacher: Merja Halme

Status of the Course: Master's Programme in Information and Service Management, elective

Level of the Course: Master's level course

Teaching period: I Autumn (2018-2019) Töölö Campus I Autumn (2019-2020) Otaniemi Campus

Workload: Contact hours 36 and one can in addition visit consultation hours (6).

No compulsory class presence but practically all need to be present in the lab hours when assignments are prepared.

Preparing the assignments and preparing for exam (independent work or work in pairs) 120 h.

Exam 4 h

Contact teaching and quizzes 36 h

Consultation face to face and interactive research plan design 6 h

Assignments excluding the interactive research plan design 70

Independent studying 44 h

Learning Outcomes: The student can design and advanced surveys and analyze their data. The special topics of surveys include preference measurement, constructs (multi-item measures) and perception measurement and clustering analysis to analyse heterogeneous preferences, perceptions and attitudes. The student knows also what kind of consumer data there exists offered by research companies in the market.

Content: The student will have a working knowledge of advanced marketing research methods. The relevant approaches for the course are:

1) data reduction methods (factor and principal component analysis), multidimensional scaling, correspondence analysis.. Producing and analysing perceptual maps.

2) multi-item measures/ constructs

3) preference measurement by conjoint analysis - designing a questionnaire using conjoint analysis, fielding it, gathering data.

analysing the data and producing the results.

4) Clustering. Carrying out clustering with data related to BIZ courses, study they also themselves responded to.

5) Familiarizing with with the consumer data gathered by marketing research companies

Assessment Methods and Criteria: Exam 50 %

Assignments and quizzes 50 %

Study Material: Lilien, Gary L. & Rangaswamy, Arvind (2003) Marketing engineering: computer-assisted marketing analysis and planning. ISBN 0130355496. (partly)

Course Homepage: <https://mycourses.aalto.fi/course/search.php?search=27E02000>

Prerequisites: Studies of basic statistics.

Evaluation: 0-5

Registration for Courses: Via WebOodi, Limit 55 in 2018. The limit in 2019 will be in case the number of participants registered exceeds the upper bound 55, the students with priority are ISM students that confirm their participation by being present in the first class.

Language of Instruction: English.

Further Information: Priority for 1) ISM students 2)MSc students

Presence during first lecture necessary

27E01000 Decision Making and Choice Behavior (6 cr)

Responsible teacher: Eeva Vilkkumaa; Juuso Liesiö

Status of the Course: Master's Programme in Information and Service Management, elective

Level of the Course: Master's level

Teaching period: V Spring (2018-2019), Otaniemi campus V Spring, (2019-2020), Otaniemi campus

Workload: Contact teaching 24 h, Independent work 133 h, Exam 3 h

Learning Outcomes: To familiarize the students with the central topics of decision theory and behavioral decision making.

Content: Rational decision making under uncertainty, quantification of uncertainty, biases, Bayesian decision theory, foundations of utility theory, behavioral decision theory: criticism of rationality axioms, prospect theory.

Assessment Methods and Criteria: Exam 50%, Assignments 50%.

Study Material: Material handed out in class, mandatory readings

Course Homepage: <https://mycourses.aalto.fi/course/search.php?search=27E01000>

Prerequisites: Business Decisions 2 or equivalent skills

Evaluation: 0-5

Registration for Courses: Via WebOodi.

Language of Instruction: English.

30E00400 Simulation (6 cr)

Responsible teacher: Tomi Seppälä

Status of the Course: Master's programme in Information and Service Management, elective

Level of the Course: Master's level course

Teaching period: Period I + 3 weeks in period II (2018-2019) Töölö campus Period I + 3 weeks in period II (2019-2020) Otaniemi campus

Workload: Contact teaching 36 h

Independent work 121 h

Exam 3 h

Total 160 h

Learning Outcomes: Students learn

- analyze and develop business models for digital and service business
- quantitative modeling using simulation techniques which can be used to support management decision making in digital and service businesses, in finance, in operations management, and in logistics etc.;
- to develop their expertise in using simulation models with computers and related software, especially Excel;
- to analyze results and making decisions through assigned homework exercises and case analyses; and
- to design research.

Content: Introduction to simulation models, simulation in Excel, random numbers, probability distributions, methods to simulate random events, managerial applications of risk analysis, probability theory, stochastic processes Random walk models, multivariate distributions, inventory simulation, service system simulation, forecasting

Assessment Methods and Criteria: 75% exam

25% assignments

Study Material: 1. Evans, J.R. & Olson, D.L. (2002) Introduction to simulation and risk analysis (selected parts)

2. Ross, Sheldon M. (2006) Simulation (selected parts).;

3. Vose, D. (2000) Risk analysis: a quantitative guide (additional readings)

Course Homepage: <https://mycourses.aalto.fi/course/search.php?search=30E00400>

Prerequisites: Undergraduate mathematics, statistics and probability, as well as Excel skills. More specifically, basic knowledge in matrix algebra, differential and integral calculus, statistical analysis and probability distributions are essential. At the minimum one course in university mathematics and two courses in university statistics is assumed.

Evaluation: 0-5

Registration for Courses: Via WebOodi

Language of Instruction: English

30E00800 Time Series Analysis (6 cr)

Responsible teacher: Tomi Seppälä

Status of the Course: Master's programme in Information and Service Management, elective

Level of the Course: Master's level course

Teaching period: Period IV + 3 weeks in period V (2018-2019) Period IV + 3 weeks in period V (2019-2020)

Workload: Contact teaching 36 h

Independent work 121 h

Exam 3 h

Total 160 h (ECTS)

Learning Outcomes: Students learn

- statistical modeling
- to understand how to analyze time series data and make forecasts in economics and business
- to design statistical research.

Content: Topics in linear models and time series analysis: special estimation methods of regression models, ARMA and ARIMA models, forecasting, stationarity, integrated series, cointegration, ARCH and GARCH models, multivariate models, panel data.

Assessment Methods and Criteria: 75% exam

25% assignments

Study Material: 1. Brooks, Chris (2008) Introductory econometrics for finance, 2nd edition or later (selected parts)

2. Enders, Walter (2010).: Applied Econometric Time Series, 3rd Edition or later (selected parts)

3. Verbeek, Marno (2004).: A Guide to Modern Econometrics. 2nd Edition (additional readings)

Course Homepage: <https://mycourses.aalto.fi/course/search.php?search=30E00800>

Prerequisites: Undergraduate mathematics and statistics and an introductory course in econometrics or regression analysis. More specifically, knowledge of statistical testing and linear regression models are essential. At the minimum one course in university mathematics and two courses in university statistics is assumed.

Evaluation: 0-5

Registration for Courses: Via WebOodi.

Language of Instruction: English

30E02000 Business Decisions 2 (6 cr)

Responsible teacher: Juuso Liesiö

Status of the Course: Master's Programme in Information and Service Management; common advanced course

Level of the Course: Master's level course

Teaching period: Period III (2018-2019) Otaniemi campus Period III (2019-2020) Otaniemi campus

Workload: Contact teaching 36h, individual work 121h, exam 3h. Total 160h (6 ECTS).

Learning Outcomes: Management Science deals with use of analytical models to help make better business decisions. This course focuses on models for supporting decision making under uncertainty, risk and multiple objectives. After the course the student can (i) recognize the types of real-life business problems where use of the models brings added value, (ii) interpret results of these models to derive defensible decision recommendations, and (iii) build and solve these models using a computer to support business decision making.

Content: Monte Carlo simulation, decision trees, value of information, expected utility theory, risk attitudes, stochastic dominance, risk measures, multi-attribute utility/value theory, modelling uncertainties and multiple objectives in optimization problems.

Assessment Methods and Criteria: Assignments 50%, exam 50%.

Study Material: Lecture slides, articles, assignments, computer implementations of mathematical models, and the textbook (An Introduction to Management Science by Anderson et al., 2014, ISBN Code: 978-1-111-82361-0).

Course Homepage: <https://mycourses.aalto.fi/course/search.php?search=30E02000>

Prerequisites: The course "30A02000 Tilastotieteen perusteet" (Introduction to Statistics) and at least one of the courses "30A03000 Talousmatematiikan perusteet" (Introduction to Business Mathematics) and "30C00600 Tilastotieteen jatkokurssi" (Continuation course in statistics). The course "27C01000 Business Decisions 1" is highly recommended. Equivalent studies in mathematics/statistics from another school/university are also acceptable.

Evaluation: 0-5

Registration for Courses: Via Weboodi

Language of Instruction: English

Further Information: A maximum of 80 students will be admitted to the course. Priority will be given to Aalto ISM MSc students and students with strong analytical skills (see prerequisites).

30E03000 Data Science for Business I (6 cr)

Responsible teacher: Pekka Malo

Status of the Course:

Master's programme in Information and Service Management, elective

Analytics and Data Science minor, elective

AALTO course

Level of the Course: Master's level course

Teaching period: III Spring (2018-2019) Otaniemi campus III Spring (2019-2020) Otaniemi campus

Workload: Contact teaching 50 h, Independent work 107 h, Exam 3 h.

Learning Outcomes: After completing the course, students will understand the basic principles of predictive modeling and gain experience in using data analytic tools (both commercial as well as open source) that are widely used in companies.

Content: Fundamental concepts in predictive analytics, classification and association mining, model evaluation, use of SPSS Modeler, R programming, visiting lectures, project work.

Assessment Methods and Criteria: Course project 40%, Class activity 30%, Exam 30%.

Study Material: To be defined in the course syllabus.

Course Homepage: <https://mycourses.aalto.fi/course/search.php?search=30E03000>

Prerequisites: Prior knowledge in programming is required, at least Programming I (37C00400) or equivalent knowledge. Working knowledge of statistics and linear algebra is also required.

Programming II (37C00450) and Data Resources Management (37E01600) are highly recommended as prior courses.

Evaluation: 0-5

Registration for Courses: Via WebOodi

Language of Instruction: English

Further Information: Maximum number of students accepted is 50. Students are prioritized in the following order:

1. Aalto ISM MSc students whose specialization area is Business Analytics
2. Aalto Analytics and Data Science minor students
3. Other Aalto MSc students

30E03500 Data Science for Business II (6 cr)

Responsible teacher: Eeva Vilkkumaa; Pekka Malo

Status of the Course: Master's programme in Information and Service Management, elective
Analytics and Data Science minor, elective

Level of the Course: Master's level course

Teaching period: IV Spring (2018-2019) Otaniemi campus IV Spring (2019-2020) Otaniemi campus

Workload: Contact teaching 50 h, Independent work 110 h.

Learning Outcomes: After completing the course, students will understand the fundamental difference between predictive and prescriptive analytics, and be able to build prescriptive models to support business decision making.

Content: Predictive models (e.g., regression and time series models), prescriptive optimization models (e.g. linear and convex), R programming, visiting lectures, project work.

Assessment Methods and Criteria: Course project 50%, Assignments and class activity 50%, a more detailed description on assessment criteria is given in the syllabus

Study Material: To be defined in the course syllabus.

Prerequisites: Data Science for Business I (30E03000) and Business Decisions 1 (27C01000) or 2 (30E02000); or equivalent skills. Intermediate / advanced skills in R programming. Time series analysis (30E00800) and Simulation (30E00400) are recommended.

Evaluation: 0-5

Registration for Courses: Via WebOodi

Language of Instruction: English

Further Information: A maximum of 50 students will be admitted to the course. Students are prioritized in the following order:

1. Aalto ISM MSc students whose specialization area is Business Analytics
2. Aalto Analytics and Data Science minor students
3. Other Aalto MSc students