

Business Analytics using Excel

Overview

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Prof. Dr. Norbert Trautmann

University of Bern

Fall Term 2023
as of September 15, 2023

Outline

- 1 Lecturer
- 2 Course
- 3 Exam
- 4 Contents
- 5 Literature

Outline

- 1** Lecturer
 - Curriculum Vitae
 - Contact
- 2 Course
- 3 Exam
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CV Mario Gnägi

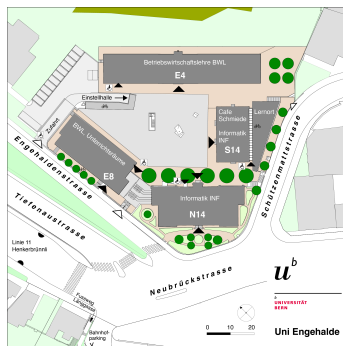
- Born in Köniz
- 2010–2015: MSc in Business and Economics (University of Bern)
- 2016–2020: PhD in Business Administration (University of Bern)
- Since 2020: Scientific Staff (University of Bern)
- Since 2022: Data Scientist and Engineer (BKW Energie AG)
- Research:
 - Combinatorial optimization
 - Data science
 - Project scheduling

CV Norbert Trautmann

- Born in Karlsruhe (Germany)
- 1997: MSc in Industrial Engineering (University of Karlsruhe)
1996–1997: Université de Lausanne and EPF Lausanne
- 2000: PhD in Business Administration (Univ. of Karlsruhe)
- 2004: Habilitation (University of Karlsruhe)
- Since 2005: Professor in Quantitative Methods in Business Administration, Department of Business Administration, University of Bern
- Research:
 - Mathematical programming
 - Operations management
 - Portfolio selection

Contact

- Department of Business Administration
- Chair in Quantitative Methods
Engelheldenstrasse 4, 3012 Bern
 - Office 206 (Mario Gnägi)
 - Office 207 (Norbert Trautmann)
- E-Mail: mario.gnaegi@unibe.ch,
norbert.trautmann@unibe.ch
- Website:
<http://www.pqm.unibe.ch>



Outline

- 1 Lecturer
- 2 Course
 - General information
 - Components of course
- 3 Exam
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Course in context of bachelor studies

- Freely selectable course for:
 - BSc in Business Administration students (major or minor)
 - BSc in Digitalization and Applied Data Science
- **Registration via e-mail** to mario.gnaegi@unibe.ch (please include an up-to-date sheet of grades)
- Confirmation of registration via ILIAS
- **Prerequisites:**
 - Introductory courses (successfully completed)
 - Quantitative Methods in Business Administration (successfully completed)

Lecture

- Time: Friday 10.15am to 12am
- Dates: 22.9., 29.9., 6.10., and 13.10.2023
- Location: Hauptgebäude H4, Seminarraum 208
- Lecture includes
 - Explanations
 - Examples
- Lecture material: ILIAS

Exercises

- Time: Friday 8.15am to 10am
- Dates: 29.9., 6.10., 13.10. and 20.10.2023
- Location: Hauptgebäude H4, Seminarraum 208
- Discussion of solutions to exercises
- Exercise material: ILIAS

Projects

- Implementation of a DSS with Microsoft Excel
- Microsoft Excel (up-to-date version; Windows or Mac)
- Schedule
 - Slides with topics available on ILIAS: 22.9.2023
 - Detailed presentation and allocation of topics: 29.9.2023
 - Presentation of concept: 13.10.2023
 - Final submission of DSS (.xlsm-file): 24.11.2023, 8am
- Office hours for questions
 - Friday 8.15am to 12am
 - Registration via e-mail (mario.gnaegi@unibe.ch)
 - Office at Engehaldenstrasse 4, room 206

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Overview exam

- 4.5 ECTS
- Oral exam
- Relevant topics:
 - Individual project
 - Contents of lecture and exercises
- Procedure:
 - Presentation of project by means of a suitable and self-developed illustrative example (12 minutes)
 - Questions (8 minutes)

Dates for oral exam

- Discussion of individual feedback: 1.12.2023, from 10.15am
- Submission of final slides for presentation: 7.12.2023
- Exam (duration 20 minutes)
 - 1 Friday, 8.12.2023, from 10.15am
 - 2 NA
- Location: will be announced after closing date for exam deregistration
- Deadlines:
 - Registration (exclusively via KSL) until 24.11.2023
 - Deregistration (exclusively via KSL) until 24.11.2023

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 - Decision support systems
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Decision support system (DSS) I

Decision support system (DSS)

Computer-based, interactive information system that provides decision-makers with models, methods, and problem-related data to support their decision-making process

Main components:

- Data base
- User interface and backend
- Models and methods

Decision support system (DSS) II

Example (Portfolio Selection)

■ Stocks:

i	1	2	3	...	20
μ_i	2.5%	3.75%	3.25%	...	5%
σ_i	15%	21%	20%	...	25%

■ Correlations:

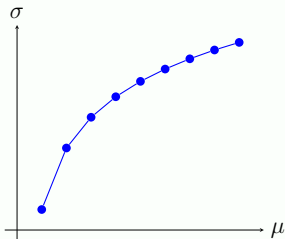
ρ_{ij}	1	2	3	...	20
1	1				
2	0.73	1			
3	0.52	0.23	1		
\vdots	\vdots	\vdots	\vdots	1	
20	0.62	0.63	0.15	...	1

- Sought: portfolio with minimal variance for a given minimum-return

Decision support system (DSS) III

Example (Portfolio Selection)

- 1 User defines scenarios to be examined (values for minimum-return)
- 2 Automatically, a portfolio with minimal variance is determined and plotted for each scenario:



- 3 User adjusts defined scenarios if necessary \Rightarrow Step 2
- 4 User selects portfolio that corresponds to the risk budget


Contents of lecture

- Decision support systems (DSS)
 - Examples for commercial systems
 - Classification
 - Components
- Development of DSS with Microsoft Excel
 - Data base
 - User interface and backend
 - Models and methods
 - Data Analytics
 - Operations Research

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Literature

-  **Albright (2015): VBA for Modelers. Thomson**
-  Laudon, Laudon (2021): Management Information Systems. Prentice Hall
-  Sharda, Delen, Turban (2022): Business Intelligence, Analytics, and Data Science: A Managerial Perspective. Pearson