Intro Master's Seminar (DS) + Data Analysis Project (BA+DH+DS)

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Outline

- The idea
- Requirements
- Expectations
- Timeline
- How to find a topic

- These slides are also here: https://teaching.vda.univie.ac.at/p1-p2-masterseminar/

The Idea

There different stages in your Master / for your scientific contributions:

- 1st (or 3rd) semester: 6 ECTS Doing Data Science
- 3rd semester: 4 ECTS Research seminar
- 3rd semester: 12 ECTS Data Analysis Project
- 4th semester: 26 (or 29) ECTS Master thesis + 2 (or 4) ECTS Masterseminar

We offer help

- Doing Data Science: getting to appreciate the breadth and diversity of applications
- DA Project: help in finding a topic
- Research Seminar: solidifying the scientific approach
- Masterseminar: solidifying + communicating the topic

The idea

- Several opportunities throughout the master's program to get to know different research directions.
- Try one out in the Projects course
- Solidify in your master's seminar

However

- if previous projects didn't work, there is a chance to switch topics for the thesis still

The idea: DA Project

- Finally your own research project
- Find something that excites you
- Find someone whose research excites you
- Use your strengths (math, stats, programming, qualitative, etc.)

The idea — Masterseminar (DS)

- Here you are writing an expose / survey paper on the topic you have chosen. This will become your first draft / literature review chapter for your thesis.
- You will give 1 presentation—Before writing: a so-called “pre-paper talk”
- Then you will write another chapter of your thesis

Formal Requirements: Master's Seminar (DS)

- You need to have successfully completed the following courses:
  - Doing Data Science
  - Ethical and Legal Issues
  - Project
  - Research Seminar
  - CORE:
    - Intro to ML
    - Statistics for DS
    - Mathematics for DS
    - Optimisation Methods for DS
    - Mining Massive Data
    - Visual and Exploratory Data Analysis

Formal Requirements: DA Project DS

- You need to have successfully completed the following courses:
  - 4 courses out of CORE:
    - Intro to ML
    - Statistics for DS
    - Mathematics for DS
    - Optimisation Methods for DS
    - Mining Massive Data
    - Visual and Exploratory Data Analysis

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Formal Requirements: DA Project BA

- At least 22 ECTS from:
  - Advanced Business Analytics
  - Advanced Operations Research
  - Modelling and Handling of Large Databases
  - Programming for Business Analytics
  - Foundations of Business Decision-Making

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Formal Requirements: DA Project DH

- Introduction to DH Tools & Methods
- Data Structures and Data Modelling

Expectations

- DA Project: find and complete an exciting research project
- Master Seminar: you are supposed to present your thesis topic to your peers to get early feedback and to become aware of related work / what others are doing
- Thesis: you are supposed to tackle the state-of-the-art in a well-defined research topic

Expectations

- It's work, i.e. studying is a full-time job!
  - 4 ECTS (Research Seminar) =
    100h of your time or 7h/week
  - 12 ECTS (DA Project) =
    300h of your time or 20h/week
  - 2 ECTS (Masterseminar) =
    50h of your time or 3.5h/week
  - 26 (or 29) ECTS (Thesis) =
    650h (or 725h) of your time in a semester

Expectations

- Project: find topic
  - best before the start of the semester (but not necessary)
  - latest by deadline for dropping the course
- Masterseminar: you should already have a topic and supervisor for your master thesis!
- meet at least 4 times during the semester with your supervisor (ideally every week!)
  1. in the beginning to clarify the topic
  2. after 4 weeks to clarify progress and milestones
  3. one month before end of semester to clarify progress and expectations
  4. end of the semester: to present your results

Expectations

- You need to attend (at least) 2 DS research talks during the course of the semester
- Why?
  - Get to know some great and inspiring researchers
  - Find out how to give inspiring talks
  - Expand your horizon
- Talks valid are the ones offered by the research network data science; see https://datascience.univie.ac.at/events/
- The “Data Dialogue will count towards this as well

Upcoming talks

- Mondays, 13:30–14:30 @ SR 8 (OG01), Kolingasse
  - Oct-13: Sebastian Schuster, CS: Data Mining and ML
  - Nov-03: Julia Partheymüller, SoSc, Dept. of Governance
  - Dec-01: Han van der Aa, CS, Workflow Systems and Technology
  - Jan-13: Axel Pichler, New German Literature
- Also, feel free to join the mailing list https://datascience.univie.ac.at/about-us/mailinglist

Grading: DA Project

- This is individual with your supervisor
- There are no further meetings on the projects with the supervisor
- However, 10% of the grade is based on attending (at least) 2 DS research talks
- Present your results as a poster at the Data Science Day on May 29, 2026

Grading: Master's Seminar (DS)

- 30% of the grade: quality of the pre-paper talk
- 30% of the grade: quality of the survey paper / thesis proposal
- 30% of the grade: quality of the second chapter
- 10% — for attending (at least) 2 DS research talks
- In order to pass the course, you need to achieve at least half of the points for the paper and the presentation, each.

Plagiarism

You will need to write your report / submission in your own words. When referring to the contents of other papers, e.g., regarding the considered problem settings or findings, you need to clearly mark this by adding a reference and, if appropriate, quotes. If you fail to do so, this would be plagiarism and will result in an “X”.

In the case of an existing survey on your topic, your paper should be substantially different. Please consult your supervisor to agree on the focus of your survey.

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Timeline Masterseminar (DS)

- **Oct 14th** (deadline for dropping the course): confirm a topic and supervisor, and enter into Moodle
- **Oct 14th**: If you have no topic, either drop the course or email me, and I will assign you a topic
- **Oct 14th**: if you didn't drop the course NOR emailed me about a topic, it is too late to assign you one; I will drop you from the course
- Meet with the supervisor at least twice between agreeing on a topic and presenting your final result
- ~**Dec 1st** — presentation day for pre-paper talk
- **Jan 10th** — submission of your survey/exposé
- **Jan 20th** — submission of 2nd chapter
- (Deadlines are strict, no extension is possible)

How to find a topic

General remarks

- you want to enjoy it! — what was the most fun subject thus far?
- take advantage of your strength (programming, math, stats, design, qualitative, …)
- search for it early (you don't want one assigned)
- talk to potential supervisors!

Which supervisors?

- In principle, everyone from the research network: https://datascience.univie.ac.at/about-us/
- Also, everyone who you had in your CORE classes is eligible
- Here are a few more specific labs

Open Topic pages

- Group Cuchiero (machine learning in mathematical finance, universal approximations in dynamic and stochastic setups, e.g., via signature methods) Contact: christa.cuchiero@univie.ac.at
- Group Ehmke / Business Analytics (see also Moodle, jan.ehmke@univie.ac.at)
- Group Hahn (astrophysics simulations, https://astro.univie.ac.at/)
- Group Hanauer (algorithmic analysis) Contact: kathrin.hanauer@univie.ac.at
- Group Zanghellini (computational biology, multi-omics, and network analysis) Contact: Jürgen Zanghellini, juergen.zanghellini@univie.ac.at https://chemnet.univie.ac.at/
- projects of various DH faculty (Andrews, Baumann, Fellner, Roth, Viehhauser, Wiegand): https://dh.univie.ac.at/projekte/data-analysis-projects/
- Data Mining and Machine Learning: https://dm.cs.univie.ac.at/teaching/open-topics/
- Visualization and Data Analysis: https://vda.cs.univie.ac.at/teaching/open-topics/

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Sportsanalytics for Rowing data

- Part of the artificial intelligence in rowing project (https://airow.univie.ac.at/)
  - Understanding the link between external and internal load: Investigate the relationship between objective external training loads, such as power output or Training Impulse (TRIMP), and subjective internal physiological responses, measured through athletes' Rate of Perceived Exertion (RPE) scores.
  - Relationship between external load and heart rate: Analyze the correlation between external loads, measured in watts, and heart rate characteristics during low-intensity endurance training sessions.
  - Data analysis of rowing stroke force curves: Conduct an exploratory data analysis of force curves from rowing strokes to develop meaningful metrics and visualizations for athletes and coaches.
  - Clustering and comparison of training sessions: Develop and evaluate methods for clustering and comparing training sessions to gain insights into athletic performance development.
  - …
- Contact Torsten Möller or Christoph Thiem (christoph.thiem@univie.ac.at)

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Sportsanalytics for Rowing data

- Part of the artificial intelligence in rowing project (https://airow.univie.ac.at/)
  - …
  - Optimizing machine learning for performance prediction: Optimize existing machine learning algorithms by integrating additional information to enhance the accuracy of training performance predictions.
  - Menstruation and performance/well-being relations: Examine the connection between the menstrual cycle and an athlete's performance and well-being data.
  - HCI for menstruation tracking: Design and implement a user interface to enable the input and visualization of crucial menstrual cycle information within the AIROW system, eliminating the need for a separate tracking application.
  - HCI for race data visualization: Develop a user-friendly interface focused on usability for importing and inputting test and race data, providing meaningful visualization and comparison options.
- Contact Torsten Möller or Christoph Thiem (christoph.thiem@univie.ac.at)