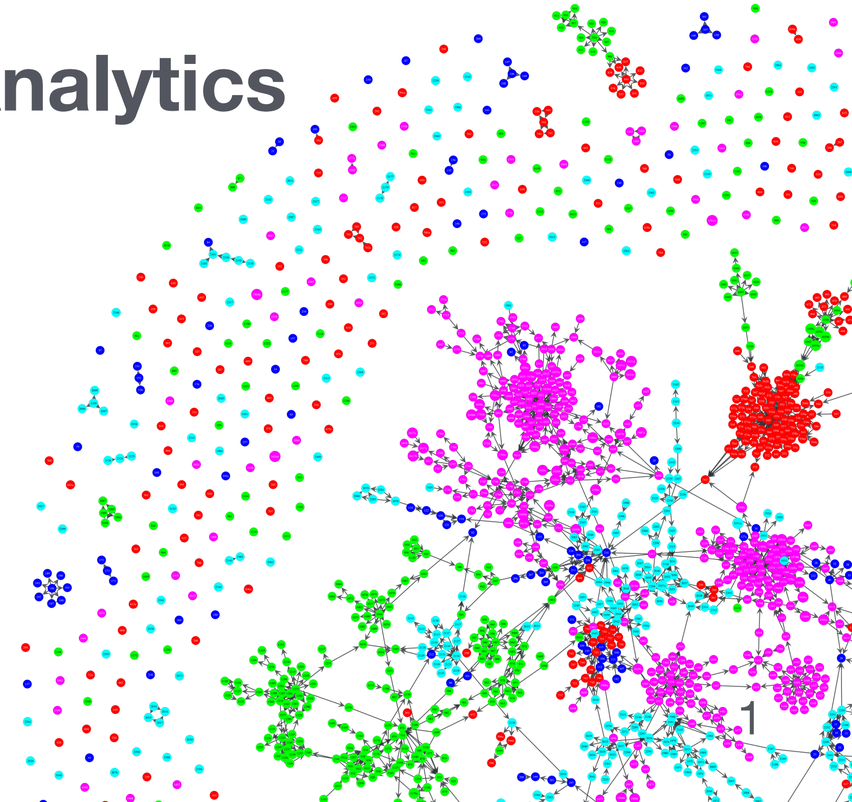
Introduction to FPSO

Master Data Engineering and Analytics

Alexander Beischl



Who? Where? What?

Academic Student Advisors
- Vivija Čeprkalo-Simić
- Dr. Sandra Kemler
- Imme Proske
- Katharina Rieke




International Student Advisor
- Lena Krone

Secretary of the Examination Board
- Huda Hossain

Program Coordinator
- Alexander Beischl

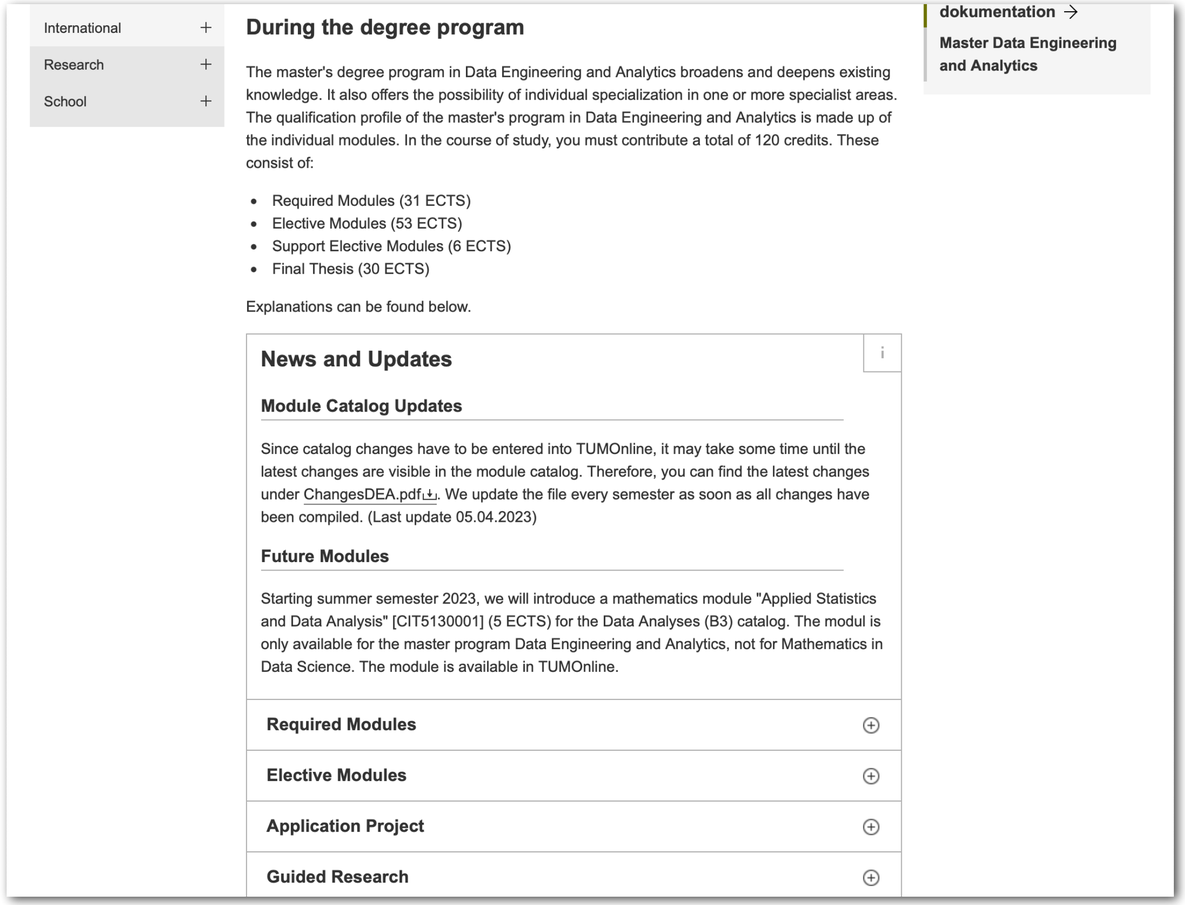


Website

Links all relevant information

- Curriculum structure
- FPSO (examination regulations)
- APSO (TUM general regulations)
- Guided research
- Application project
- Thesis information

https://www.cit.tum.de/en/cit/studies/degree-programs/master-data-engineering-and-analytics/



Curriculum Structure

Mandatory and Elective Modules

Listed on our website

Current Students
→Master's Programs
→Data Engineering and Analytics
→Compulsory-, Elective-, … Modules
→FPSO 2018

Required Modules

The following required modules must be completed in the Data Engineering and Analytics Master's program:

IN2326 Foundations in Data Engineering (winter semester)

MA4800 Foundations in Data Analysis (summer semester)

IN2107 Advanced Seminar Course

IN2106 Advanced Practical Course

Elective Modules

A total of at least 53 ECTS must be completed from the Elective Modules in the areas listed below and the Elective Modules in Informatics. You must meet the following requirements:

You have to take modules of at total of at least 15 ECTS from the three areas "Data Engineering", "Data Analytics" and "Data Analysis", with at least one module from each of the three areas.
You have to take modules of at total of at least 25 ECTS from the two areas "Advanced Topics in Data Engineering" and "Special Topics in Analytics", and have to take at least one of the modules IN2169 "Research Work under Guidance" or IN2328 "Application Project".

The list of all modules can be found in TUMonline in your study plan.

Special regulations for individual modules

In Data Analytics, only one of the following three modules can be counted towards your degree:
IN2028 Business Analytics and Machine Learning
IN2339 Data Analysis and Visualization in R
IN2030 Data Mining and Knowledge Discovery

If you started your studies before October 2019, you can also take module IN2323 in the area of Data Analytics.

In Special Topics in Data Analytics, only one of the following three modules can be counted towards your degree:
IN2364 Advanced Deep Learning for Computer Vision

Curriculum Structure

Overview

A: Modules are mandatory

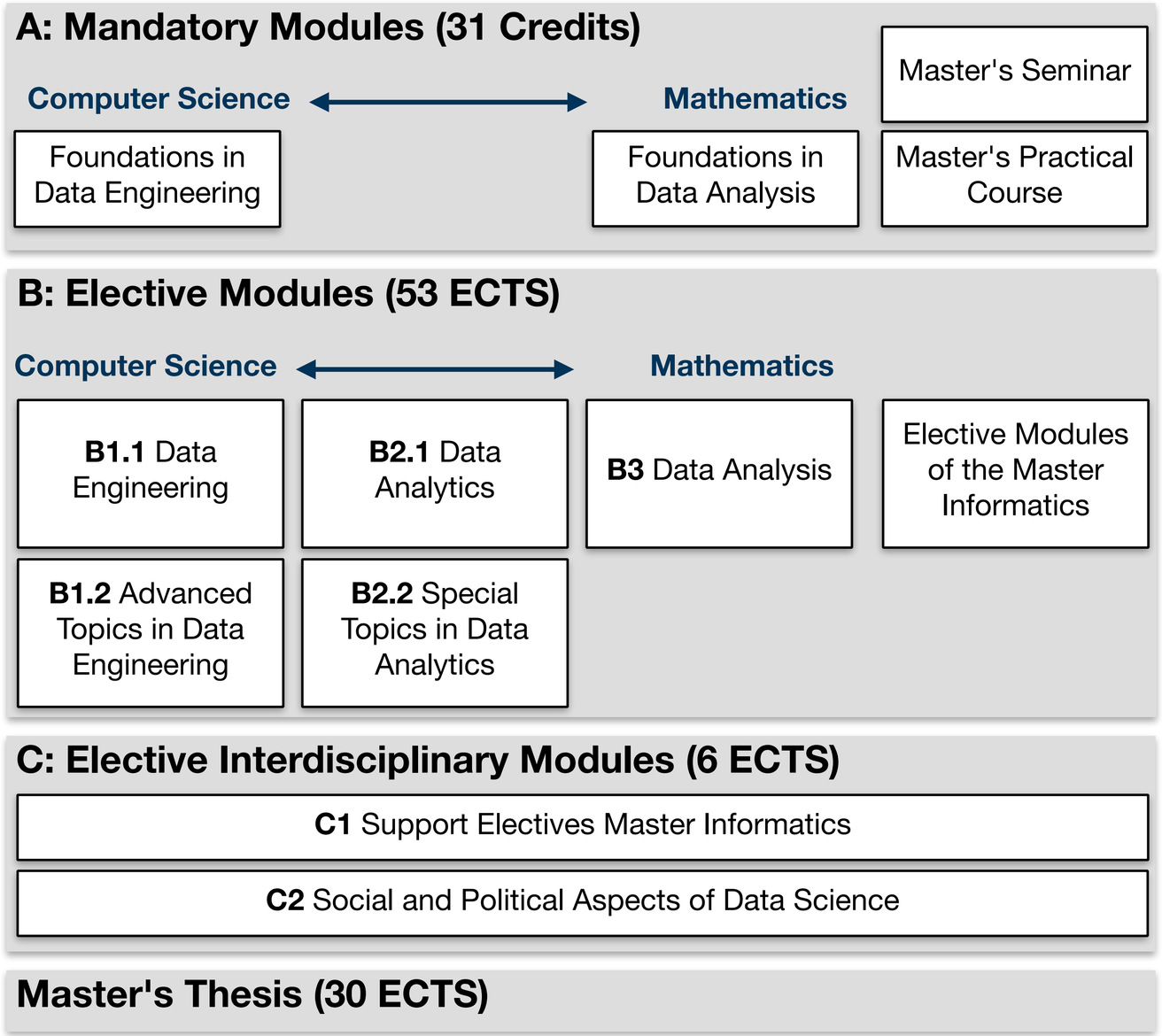
B: Catalog of elective modules from different areas

➡ Choose modules (with small constraints)

- Columns have a different focus

C: Interdisciplinary modules

Master's Thesis

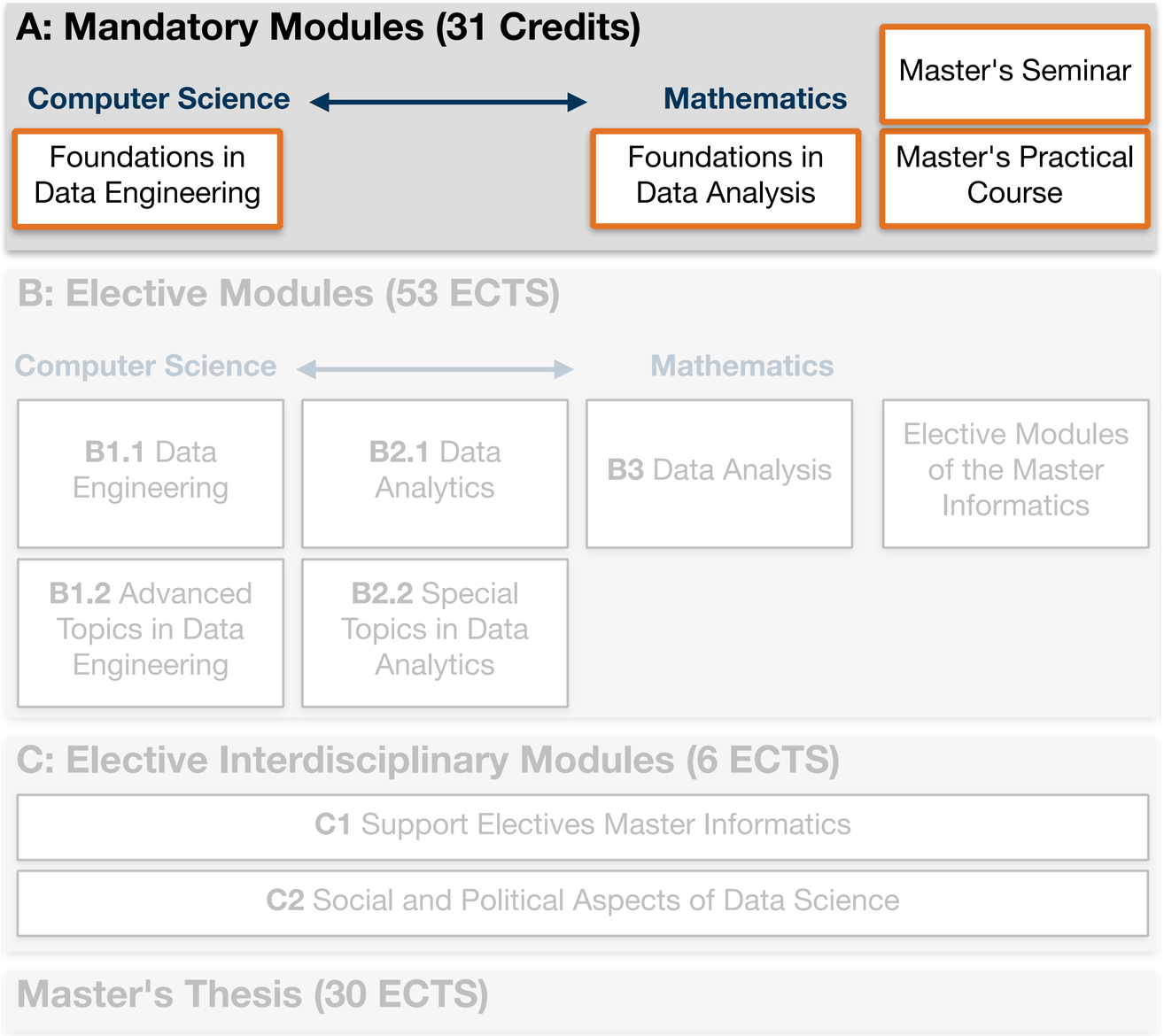


Curriculum Structure

Mandatory Modules

- Foundations in Data Engineering (IN2326, 8 ECTS)
- Foundations in Data Analysis *(MA4800, 8 ECTS)*
- Master's Seminar *(IN 2107, 5 ECTS)*
- Master's Practical Course *(IN2106, 10 ECTS)*

- Listed in the FPSO in: *A Mandatory Modules*

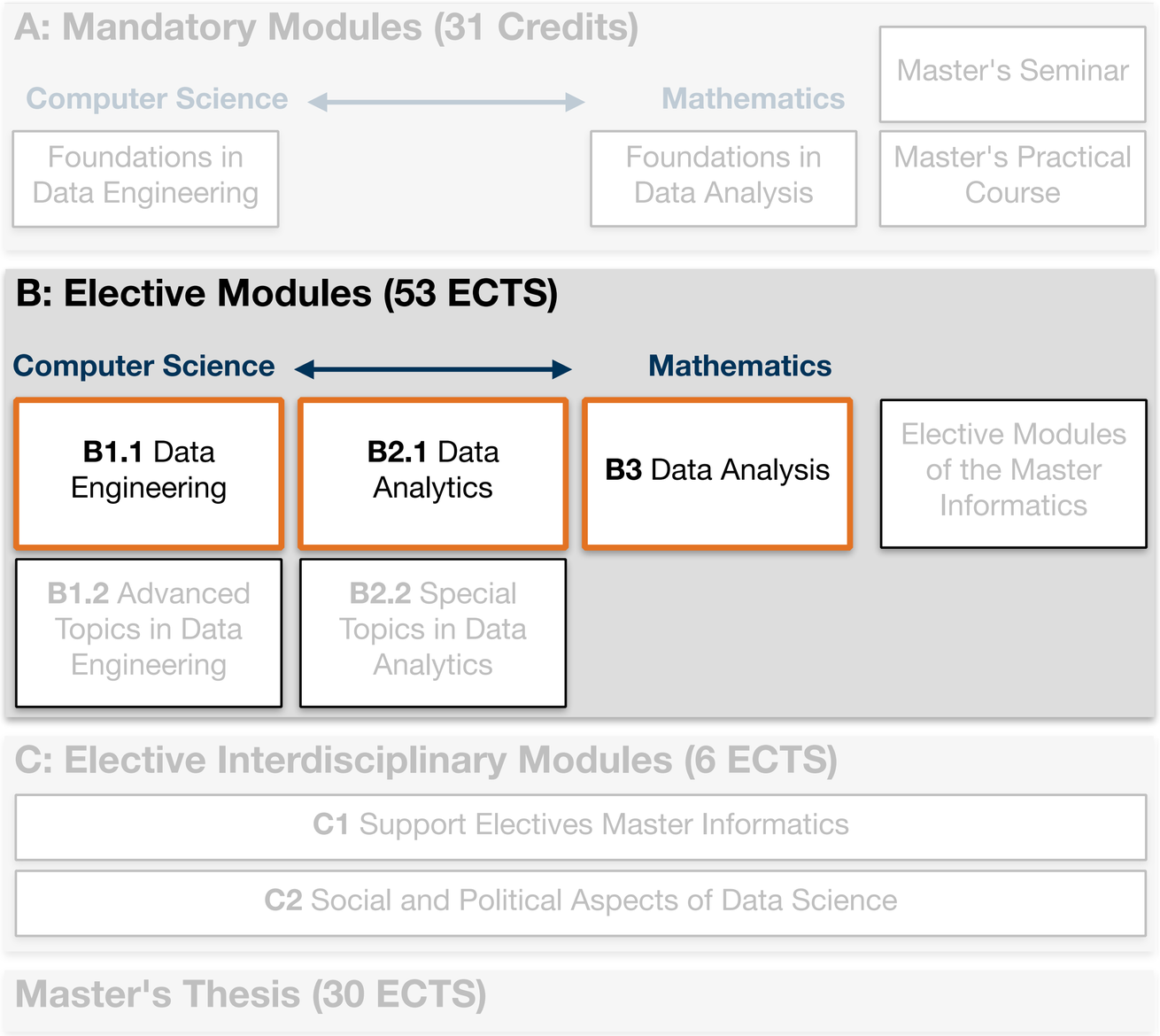


Curriculum Structure

Elective Modules - Electives 1

- Earn at least *15 ECTS* in core groups
- Complete at least one module in each group

Listed in the FPSO in: *B Elective Modules*

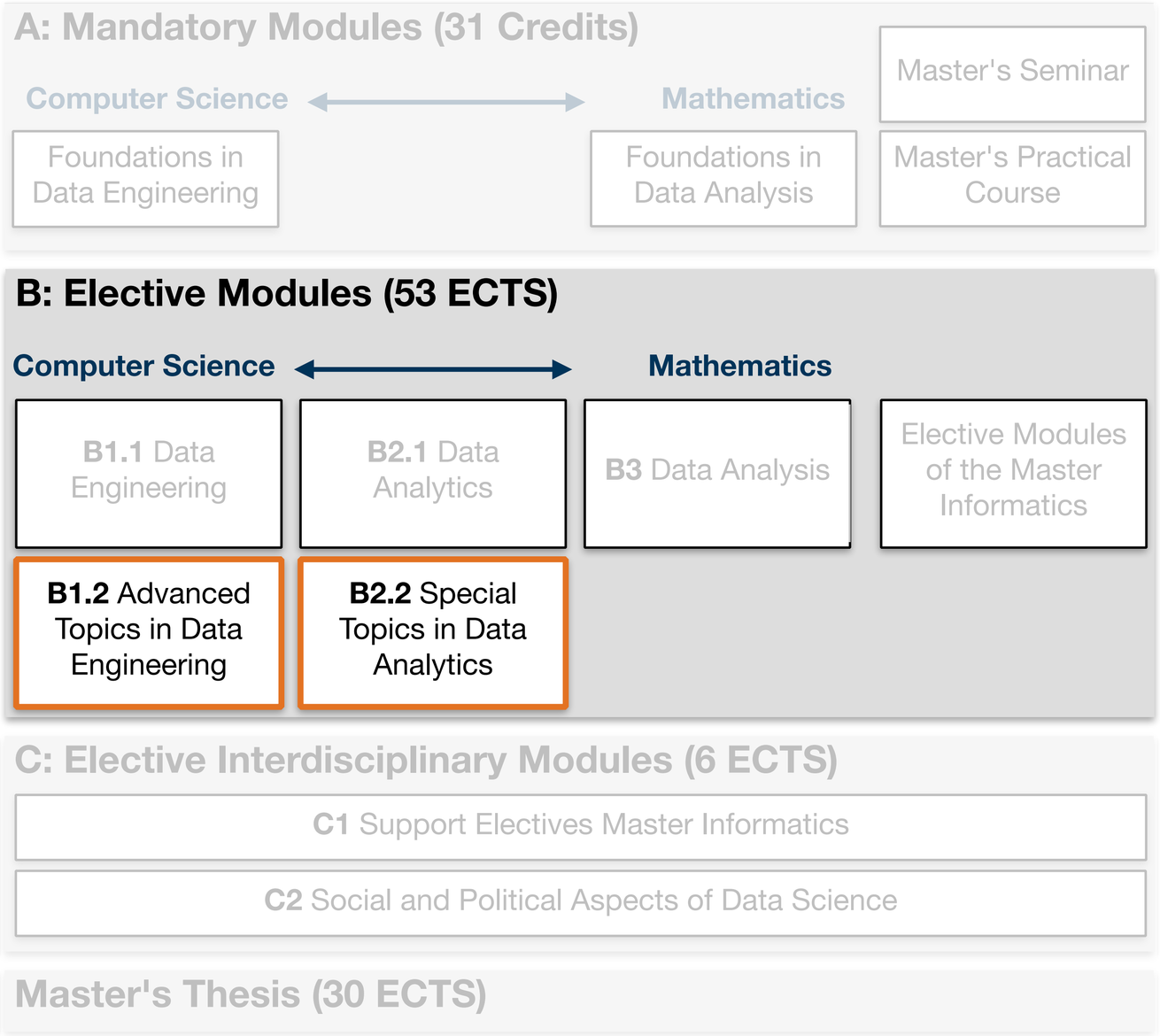


Curriculum Structure

Elective Modules - Electives 2

- Earn at least *25 ECTS* in advanced/ special groups
- Includes *Guided Research* or *Application Project*
- Complete at least *Guided Research* or *Application Project*

Listed in the FPSO in: *B Elective Modules*



Curriculum Structure

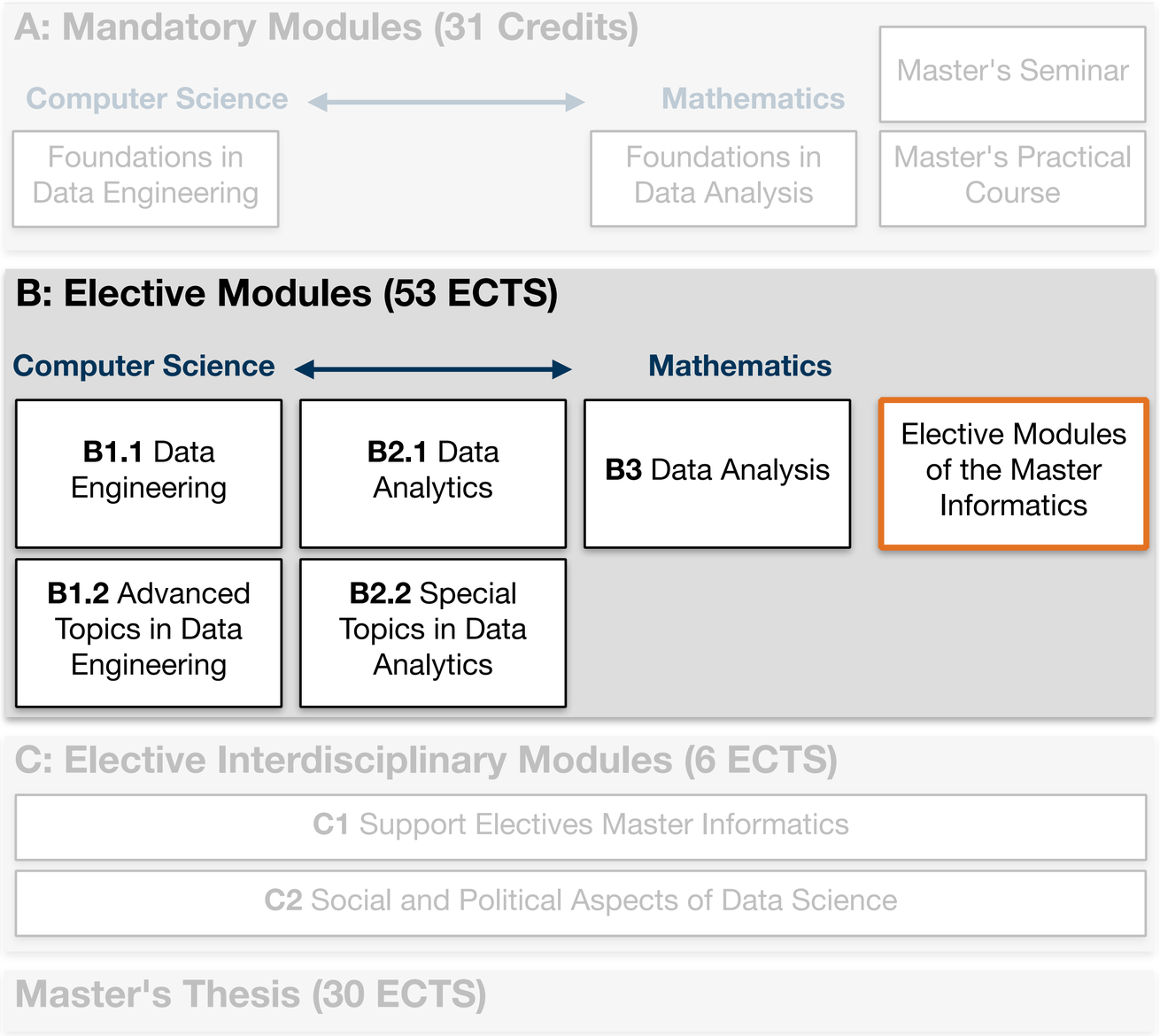
Elective Modules - Electives 3

For the remaining 13 ECTS of *B: Elective Modules*

- Additional modules from B1.1, B1.2, B2.1, B2.2, B3
- Elective modules of the Master Informatics

➡**Sum** of taken modules from:
B1.1, B1.2, B2.1, B2.2, B3, Elective modules of the Master Informatics **≥ 53 ECTS**

Listed in the FPSO in: *B Elective Modules*



Curriculum Structure

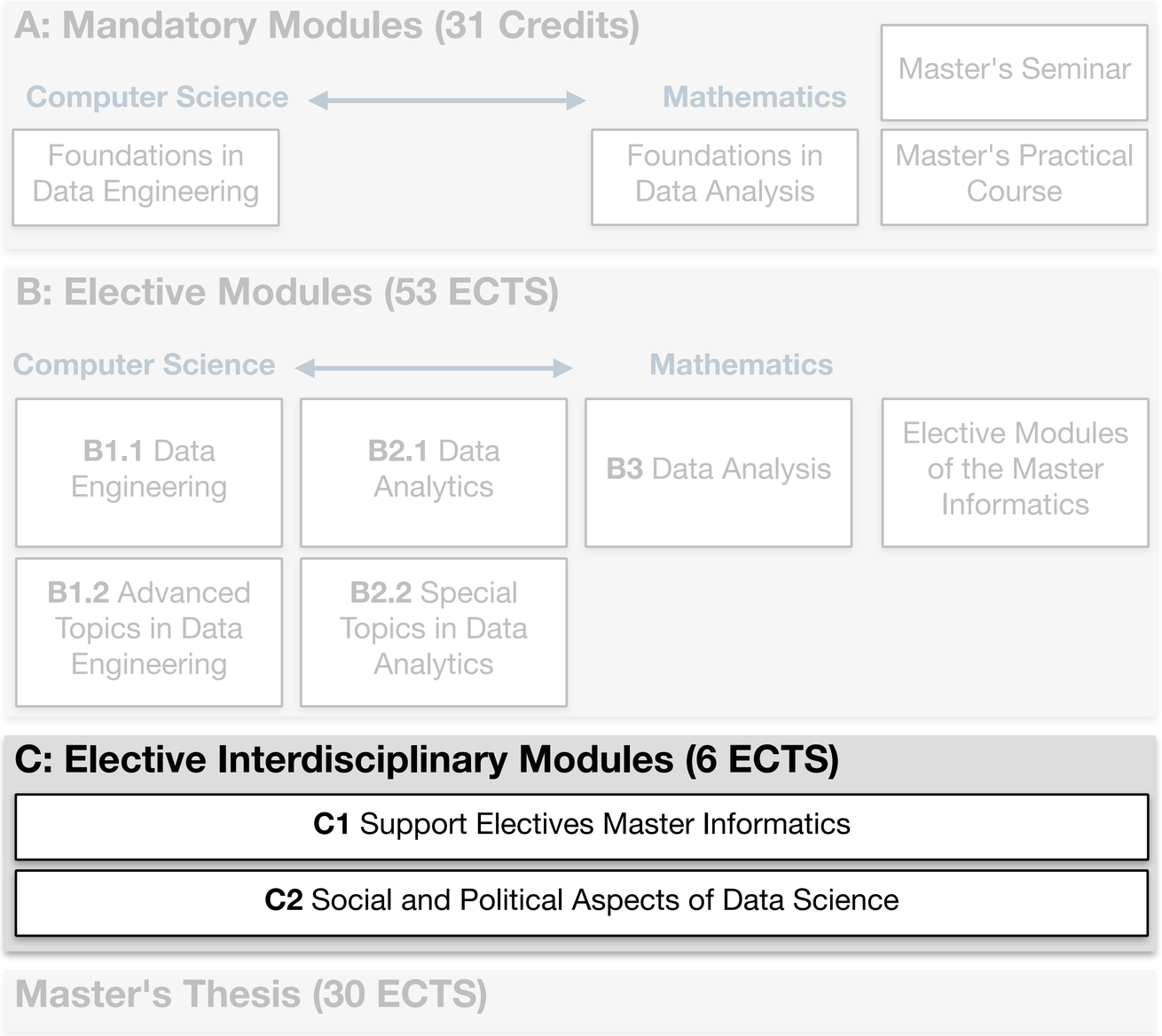
Electives Interdisciplinary Modules

Earn at least 6 Credits:

- **3 ECTS** Support Electives Master Informatics
  - Module catalogue of Master Informatics or
  - Language courses or
  - Courses from the Carl-von-Linde-Academy

- **3 ECTS** Social and Political Aspects of Data Science

Listed in the FPSO in: *C Interdisciplinary Elective Modules*



Curriculum Structure

Module Catalog - TUMOnline

Node filter-Name		Part of Curricul
[20181] Data Engineering and Analytics		Yes
Master's Thesis		Yes
Required Modules Data Engineering and Analytics		Yes
Advanced Practical Course		Yes
Advanced Seminar Course		Yes
Elective Modules		Yes
Data Engineering		Yes
Data Analytics		Yes
[IN99645] Accepted Elective Module from Abroad in Data Analysis		Yes
[EI7649] Approximate Dynamic Programming and Reinforcement Learning		Yes
[IN2124] Basic Mathematical Methods for Imaging and Visualization		Yes
[IN2023] Image Understanding I: Machine Vision Algorithms		Yes
Data Analytics - 1 out of 4		Yes
[IN2028] Business Analytics and Machine Learning		Yes
[IN2339] Data Analysis and Visualization in R		Yes
[IN2030] Data Mining and Knowledge Discovery		Yes
[IN2406] Fundamentals of Artificial Intelligence		Yes
[IN2133] Principles of Computer Vision		Yes
[IN2369] Machine Vision		Yes
[CIT3330000] Introduction to Mobile Robotics		Yes
Machine Learning - 1 out of 2		Yes
Modelling and Simulation		Yes
[IN2026] Visual Data Analytics		Yes
[IN2071] Knowledge-based Systems for Industrial Applications		Yes

A: Mandatory Modules (31 Credits)

Computer Science ⟷ **Mathematics**

- Foundations in Data Engineering
- Foundations in Data Analysis
- Master's Practical Course
- Master's Seminar

B: Elective Modules (53 ECTS)

Computer Science ⟷ **Mathematics**

- **B1.1** Data Engineering
- **B2.1** Data Analytics
- **B3** Data Analysis
- Elective Modules of the Master Informatics
- **B1.2** Advanced Topics in Data Engineering
- **B2.2** Special Topics in Data Analytics

C: Elective Interdisciplinary Modules (6 ECTS)

- **C1** Support Electives Master Informatics
- **C2** Social and Political Aspects of Data Science

Master's Thesis (30 ECTS)

Curriculum Structure

Module Catalog - TUMOnline

Node filter-Name		Part of the Curriculum	rec. sem.	Credits	WF
[20181] Data Engineering and Analytics		Yes		120	1
Master's Thesis		Yes		30	1
Required Modules Data Engineering and Analytics		Yes		16	1
Advanced Practical Course		Yes		10	1
Advanced Seminar Course		Yes		5	1
Elective Modules		Yes		53	1
Data Engineering		Yes			1
Data Analytics		Yes			1
[IN99645] Accepted Elective Module from Abroad in Data Analysis		Yes			1
[EI7649] Approximate Dynamic Programming and Reinforcement Learning		Yes		6	1
[IN2124] Basic Mathematical Methods for Imaging and Visualization		Yes		5	1
[IN2023] Image Understanding I: Machine Vision Algorithms		Yes		3	1
Data Analytics - 1 out of 4		Yes			1
[IN2028] Business Analytics and Machine Learning		Yes		5	1
[IN2339] Data Analysis and Visualization in R		Yes		6	1
[IN2030] Data Mining and Knowledge Discovery		Yes		3	1
[IN2406] Fundamentals of Artificial Intelligence		Yes			1
[IN2133] Principles of Computer Vision		Yes		4	1
[IN2369] Machine Vision		Yes		6	1
[CIT3330000] Introduction to Mobile Robotics		Yes		6	1
Machine Learning - 1 out of 2		Yes			1
Modelling and Simulation		Yes			1
[IN2026] Visual Data Analytics		Yes		5	1
[IN2071] Knowledge-based Systems for Industrial Applications		Yes		4	1

A: Mandatory Modules (31 Credits)

Computer Science ⟷ **Mathematics**

- Foundations in Data Engineering
- Foundations in Data Analysis
- Master's Practical Course
- Master's Seminar

B: Elective Modules (53 ECTS)

Computer Science ⟷ **Mathematics**

- **B1.1** Data Engineering
- **B1.2** Advanced Topics in Data Engineering
- **B2.1** Data Analytics
- **B2.2** Special Topics in Data Analytics
- **B3** Data Analysis
- Elective Modules of the Master Informatics

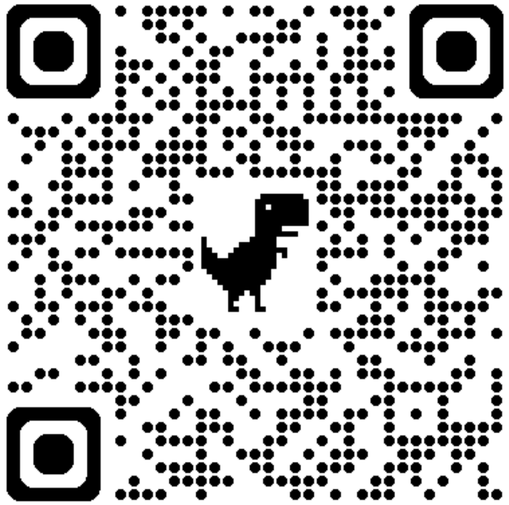
C: Elective Interdisciplinary Modules (6 ECTS)

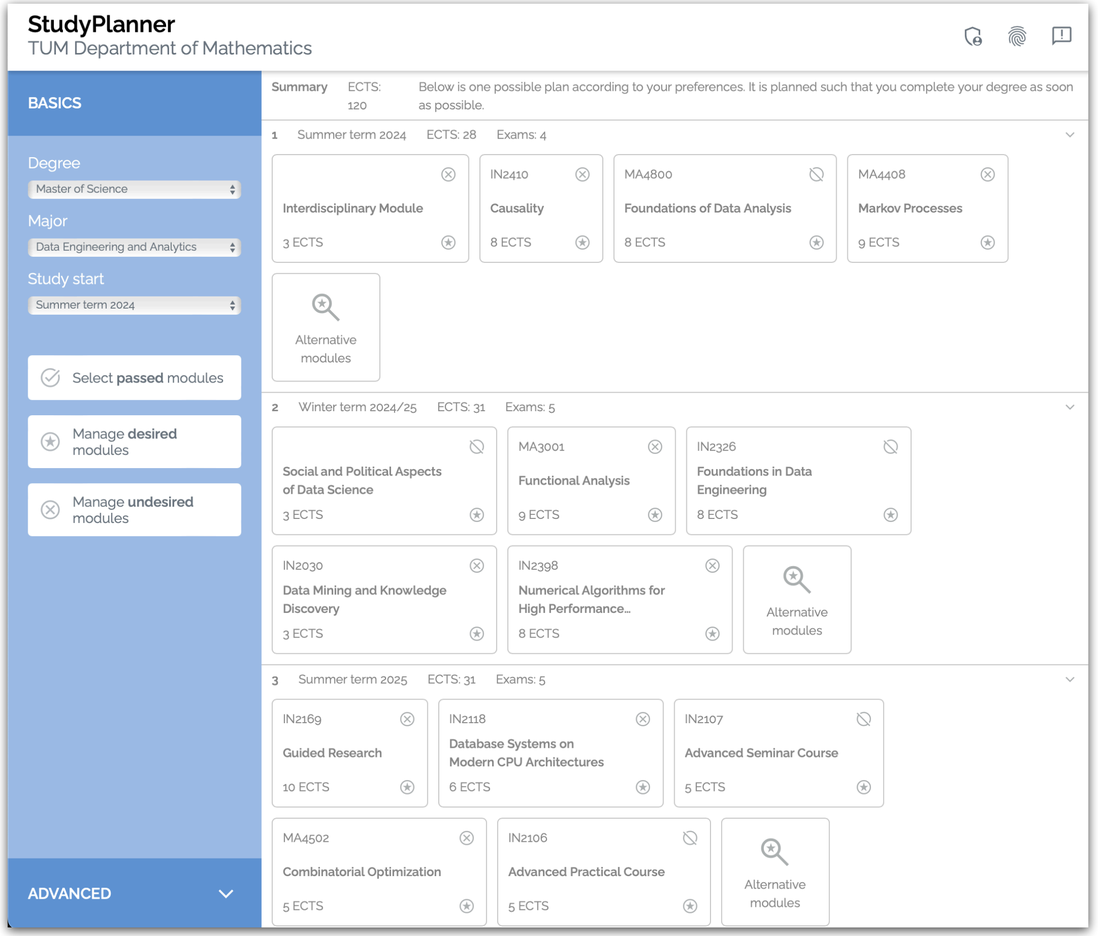
- **C1** Support Electives Master Informatics
- **C2** Social and Political Aspects of Data Science

Master's Thesis (30 ECTS)

Planing Your Studies - StudyPlanner

(by TUM's Department of Mathematics)





Credit Requirements over Time

- Until the end of the 2nd semester: at least one module from section A or B
- Until the end of the 3rd semester ≥ 30 ECTS Credits
- Until the end of the 4th semester ≥ 60 ECTS Credits
- Until the end of the 5th semester ≥ 90 ECTS Credits
- Until the end of the 6th semester 120 ECTS Credits

If You are about to fail one of the requirement deadlines:

Please talk to the academic student advisors. In coordination with them, contact the chairman of the examination committee in written form and state the reasons.

If such a failure can be forseen: contact one of the academic student advisors immediately.

Student Code of Conduct

Compilation of TUM rules on

- **Plagiarism** and
- **Cheating**

Meant as

- good advice and
- help to avoid mistakes

Please read the full document on your own on our website: https://www.cit.tum.de/fileadmin/w00byx/cit/Studium/Im_Studium/Thesis/leitfaden-en_2016Jun22.pdf

Department of Informatics
Technical University of Munich

Student Code of Conduct

(June 22, 2016)

The purpose of examinations and coursework is to monitor advancements in skills and expertise. They also document that TUM graduate students have acquired methodological competence and master scientific fundamentals in their area of expertise (§2 (3) APSO). Our students therefore learn to work self-reliantly and use allowed resources only. It is important to correctly cite any resources to avoid plagiarism[1] or only suspicion thereof. This applies to both seminar papers and final theses as well as any kind of homeworks and (programming) exercises.

To offer our students the best education possible we support our students to avoid such mistakes and point to the following basic rules of citation:

1. Short text passages of another's work may be cited.
   - Citations must be clearly marked. Complete and comprehensible documentation of all sources is required.
   - Literal citations of text passages, parts of a sentence, or terms and definitions must be quoted. The respective source must be stated directly before or after a citation.
   - An unreflected concatenation of citations is not considered a personal contribution.
2. Non-literal paraphrases[2], e. g. explanations or essays in own words, must also be marked as someone else's contribution by stating the original sources directly before or after the respective text passages.
   - Additional references might be necessary although the respective source has previously been cited, e. g. referring to somebody else's contributions and results.
   - The same rules apply to source code that is self-written but based on existing implementations.
3. Using materials of someone else such as images, data, tables, source code etc., requires special attention. This also applies to content retrieved from the internet:
   - The authorship of all material must be completely documented and traceable, e. g. by listing original source inline in source code.
   - Ideas, outlines etc. that are based on contributions of another person must be clearly marked and documented.
   - Usage of images or graphics require citations. In certain cases, an explicit permission of the original's author may be required.
   - This also applies to graphics that are "re-drawn".
4. List all sources in a bibliography at the end of your written work and refer to specific entries in your text when used (§18 (9) APSO).
5. Try to cite scientific sources only and refer to primary sources[3] whenever possible.
6. If explicitly allowed by the lecturer, coursework may be provided in collaborative team effort. In this case the individual contributions must be visible and assessable (§18 (9) APSO).

Student Code of Conduct

Quick Overview

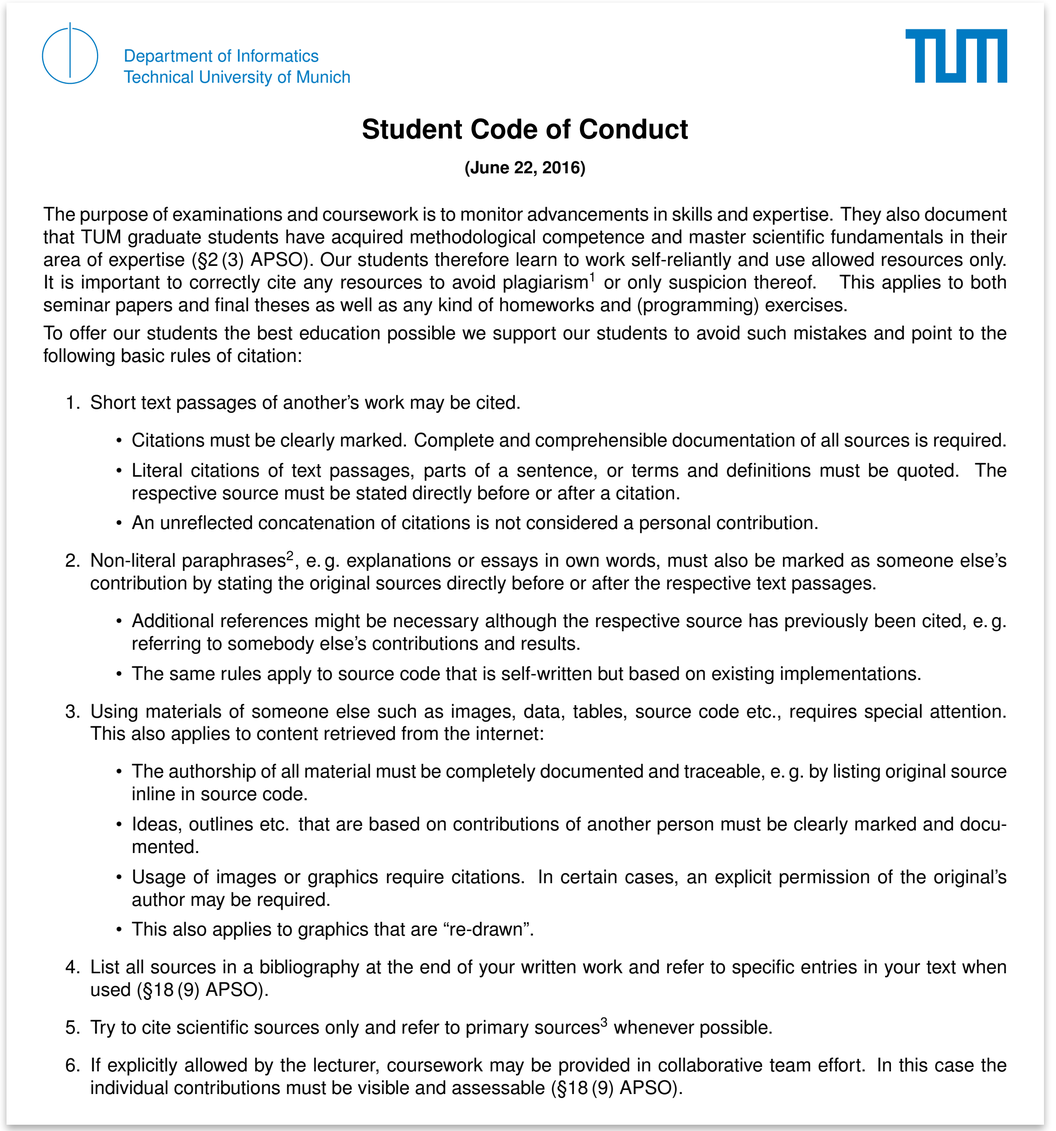
Course achievements and examinations have to be performed self-reliantly and on the basis of allowed resources only.

Short text passages may be cited, but
- clearly marked
- literal citations must be quoted

Non-literal paraphrases must be quoted clearly, immediately, and reproducibly.

Use a full bibliography and primary sources.

Cheating leads to failing with only one possibility of retake.



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Examination

You can pass each module **only once**, no retake for grade improvement.

Most modules are only offered in summer or winter term

- Regular exam period
- Retake exam period

If you are caught cheating:

- Exam is graded "5.0 U"
- Only one attempt to pass the exam remaining

Staying Abroad

Please read all about it at https://www.cit.tum.de/en/cit/studies/international/informatics-outgoing/
Then, talk to Lena Hengstler for guidance.

For each module from abroad that you want to use towards your degree:

- For modules that have sufficient similarities with an existing module from TUM: contact the respective TUM Professor.
- Or, if it is in the spirit of the catalog, try a free recognition.

For non-TUM Bachelors:

- You need to complete one full semester before going abroad.

Talent Management & Diversity

In case you experience any form of discrimination:

- Contact the *Vice Dean Talent Management & Diversity* (Donna Ankerst, ankerst@tum.de)
- More information: https://www.cit.tum.de/en/cit/school/organization/talent-management-diversity/

General Feedback for TUM: https://www.tum.de/en/about-tum/contact-directions/feedback

Tips from Guidance Counselors

Please talk to the academic advisors for

- Advice on your study plan
- Internships or thesis abroad
- Examination Regulations
- Learning Methods
- Any issues you may have here at TUM

Contact: advising@in.tum.de

Website: https://www.cit.tum.de/en/cit/studies/students/advising/informatics/tips-for-successful-studies/

Welcome at TUM and Successful Studies!