Elite Master Program

MSc Data Science

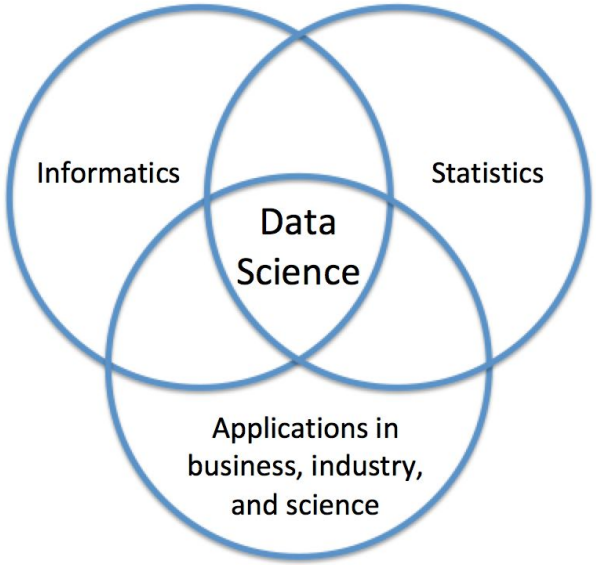
LMU Munich

Data Science – What is it about ?

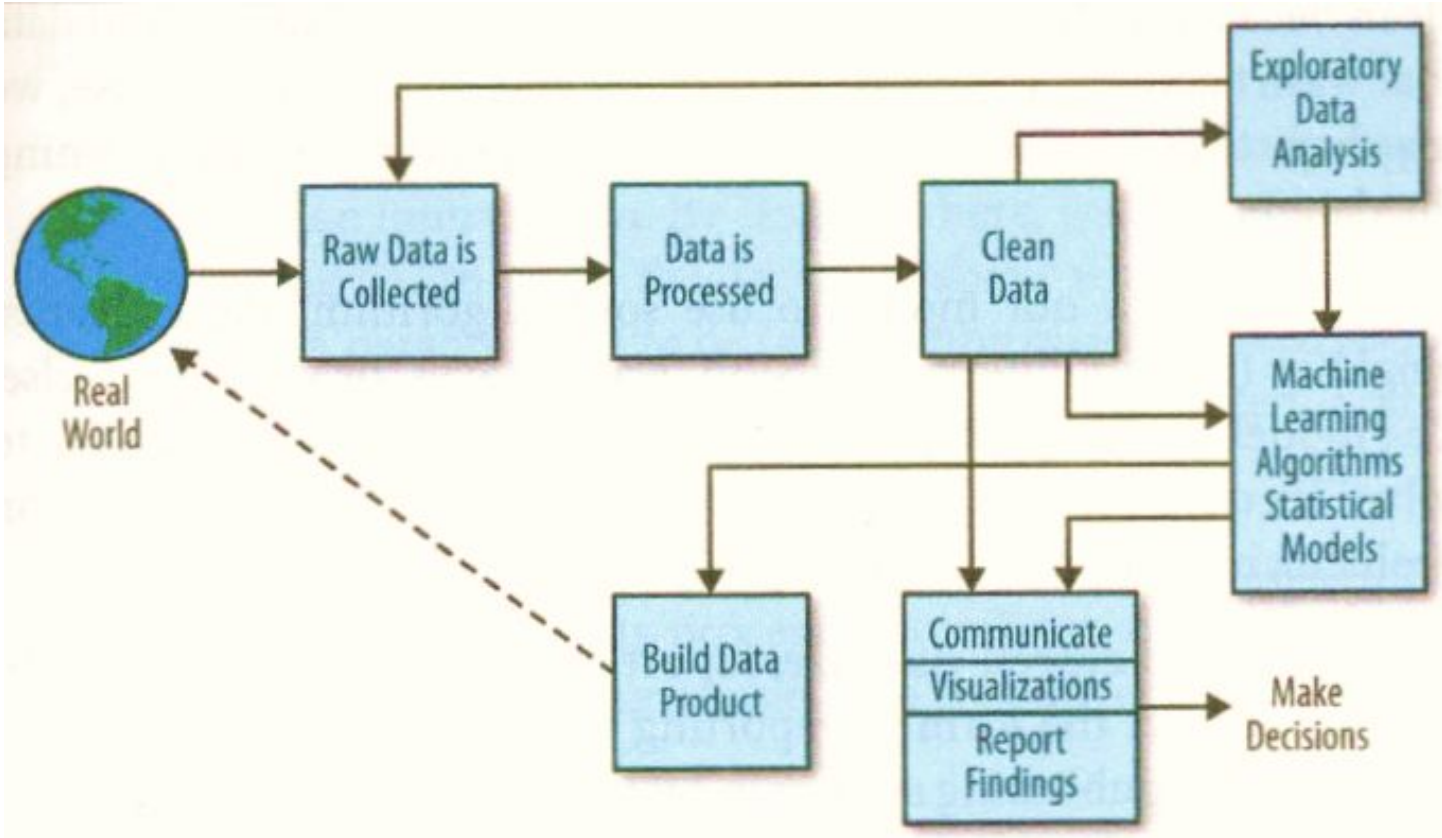
Data Science combines **informatics** and **statistics** in order to extract information from real data.

"Data Science is a blend of Red-Bull-fuelled hacking and espresso-inspired statistics"

(Mike Driscoll, CEO Metamarket)



Data Scientists – What do they do?



Source: C. O'Neil, R. Schutt (2014), Doing Data Science, O'Reilly Media Inc., USA.

Data Scientists – What do they do?

Retrieve information from data

Apply machine learning tools

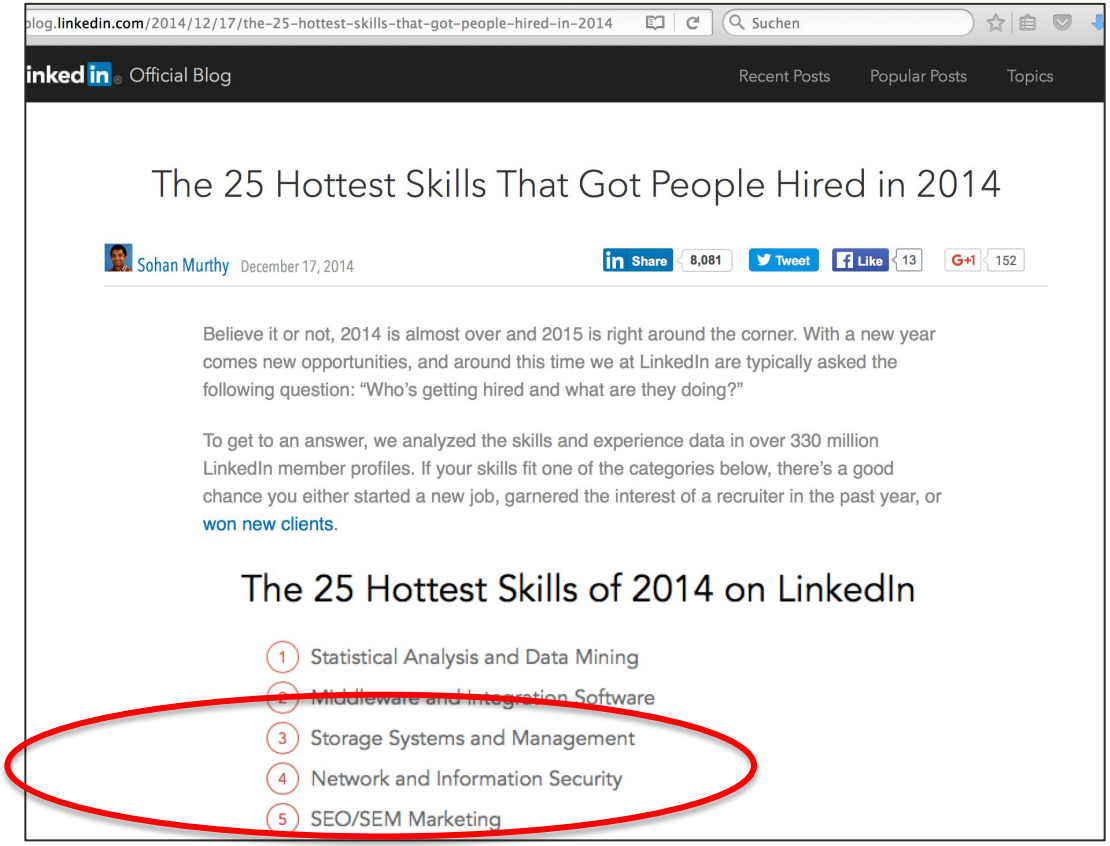
Use statistical models

Deal with data confidentiality

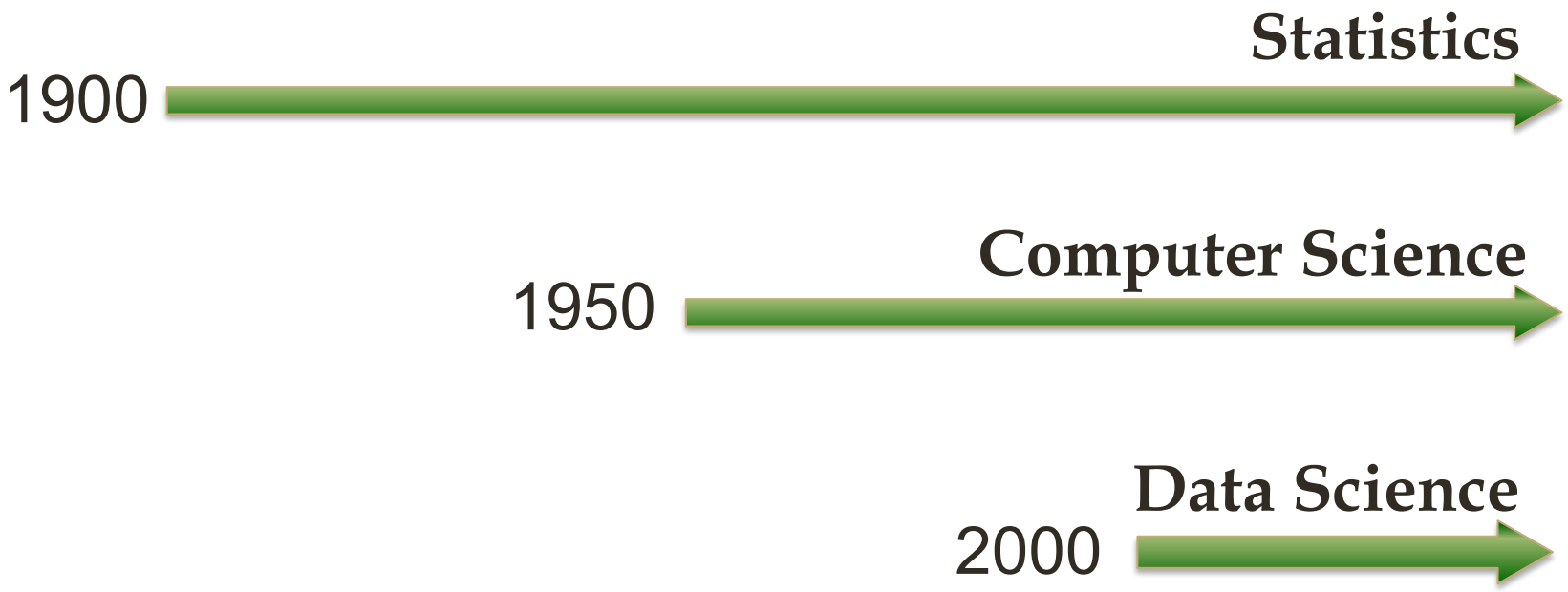
Communicate the results

Source: C. O'Neil, R. Schutt (2014), Doing Data Science, O'Reilly Media Inc., USA.

Data Scientists – Why are they needed by the industry?



Statistics and Data Science



Data Scientists – Why are they needed?

- Increasing data accessibility and availability
- Big Data requires Big Data Analytics
- New action plans required in order to **extract information from data**
- Data analysts with **computational and statistical skills** are needed by industry, business, and science

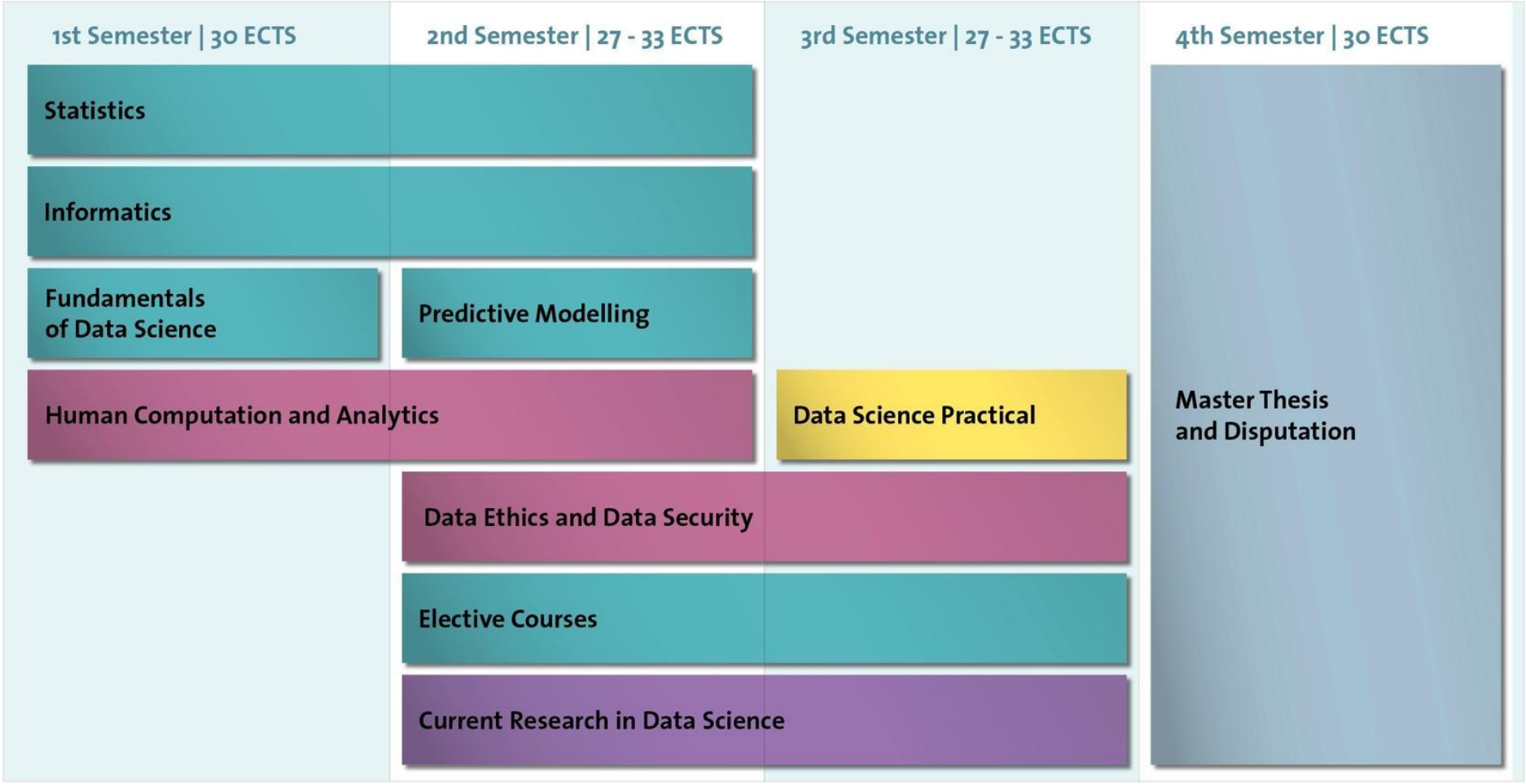
MSc Data Science@LMU

- The program is run **jointly** and **interdisciplinarily** by the Institutes of **Statistics and Informatics**
- There is **no other international Data Science master program that combines both fields in Germany**
- This is the first Data Science program **in English** in Germany

MSc Data Science@LMU – Elite Program

- Part of the **Elite Network of Bavaria** (ENB)
- LMU is a "**hot spot**" in Statistics and Informatics
- Statistics and Informatics are **in one faculty**
- DataScience@LMU attracts **high-potential students**

Curriculum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2nd Semester | 27 - 33 ECTS
3rd Semester | 27 - 33 ECTS
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Predictive Modelling
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Master Thesis and Disputation
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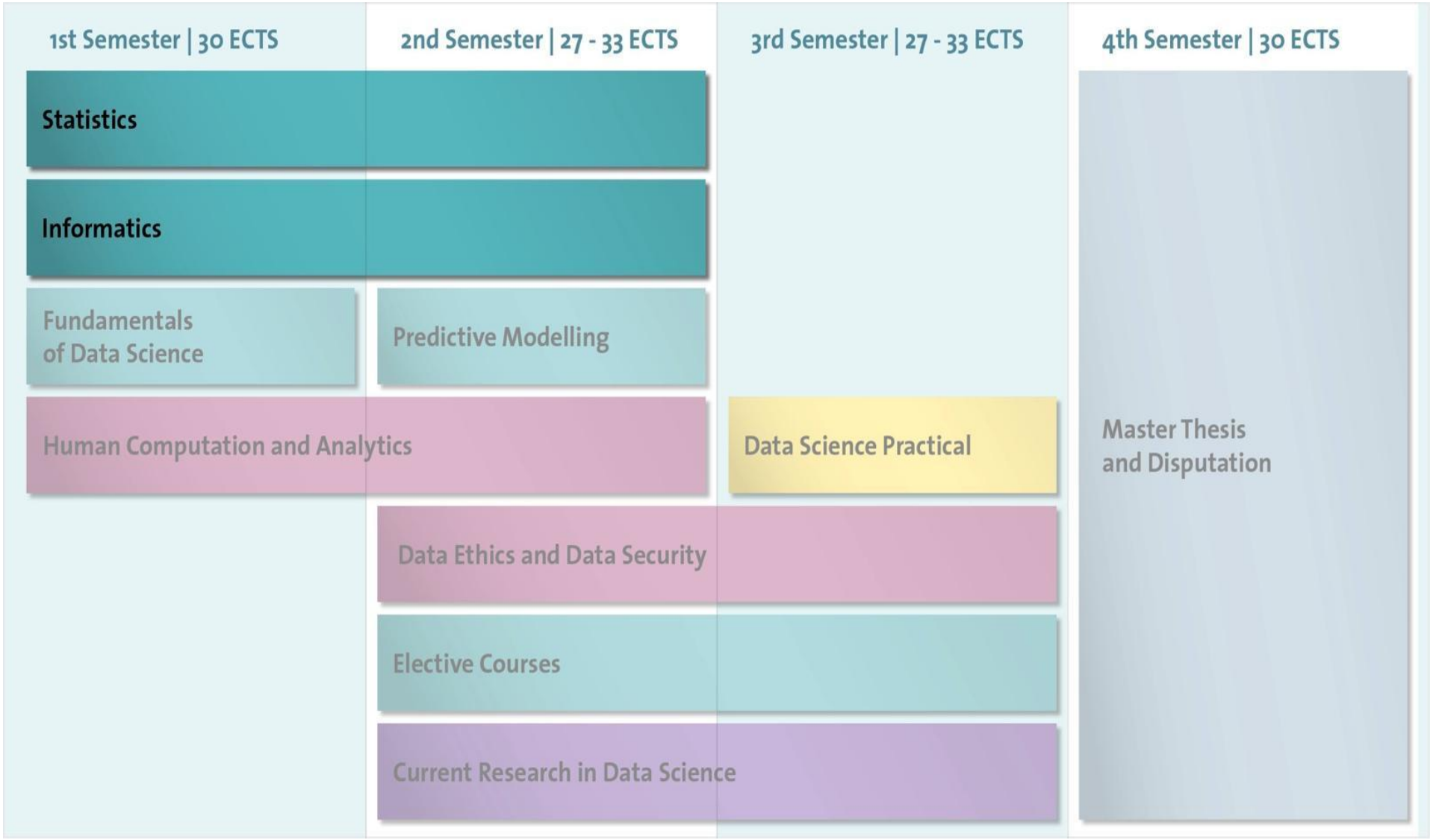
Elective Courses
Current Research in Data Science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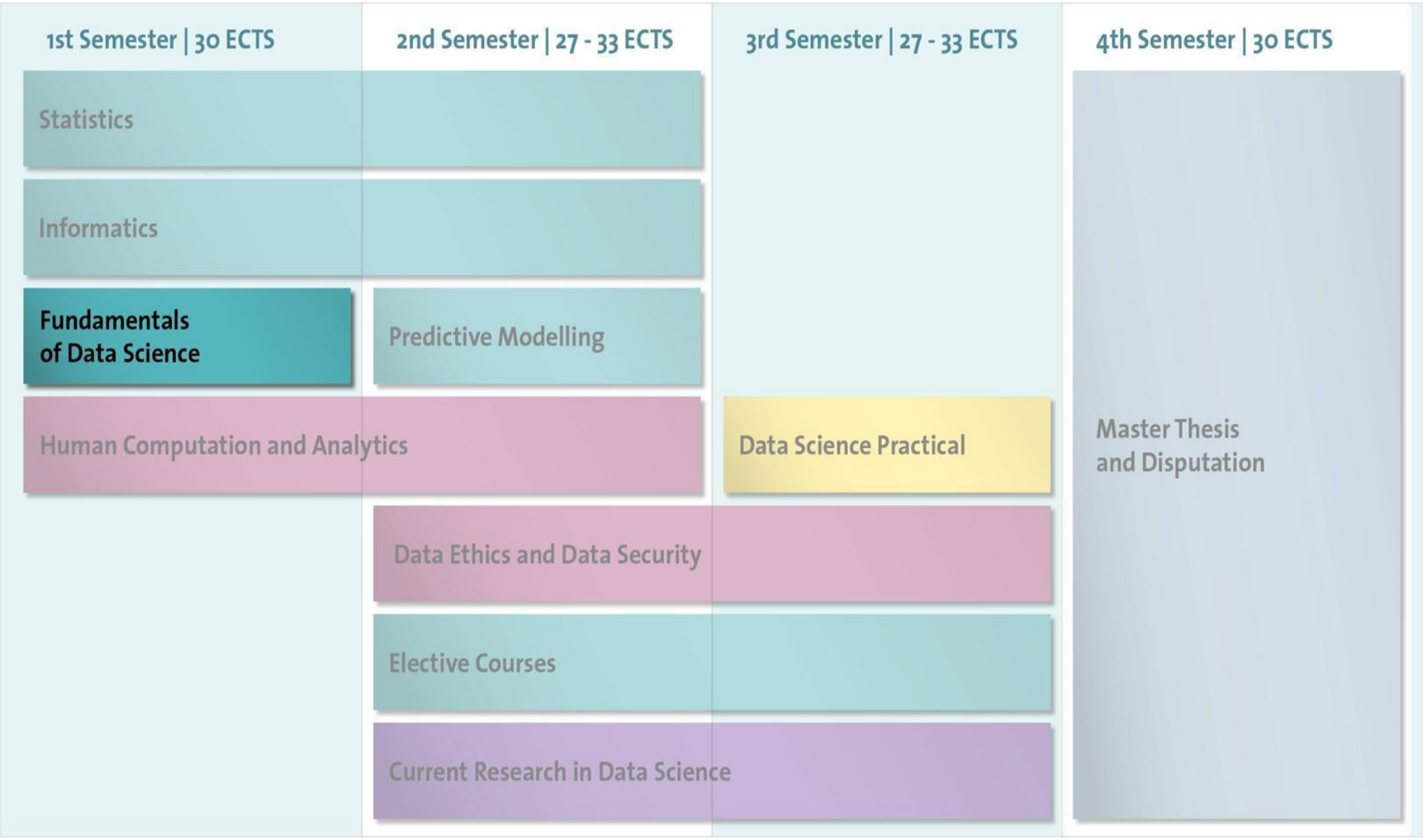
Core Module: Statistics

- Statistical Reasoning and Inference
- Sampling and Experimental Design

Core Module: Informatics

- Knowledge Discovery and Data Mining
- Big Data Management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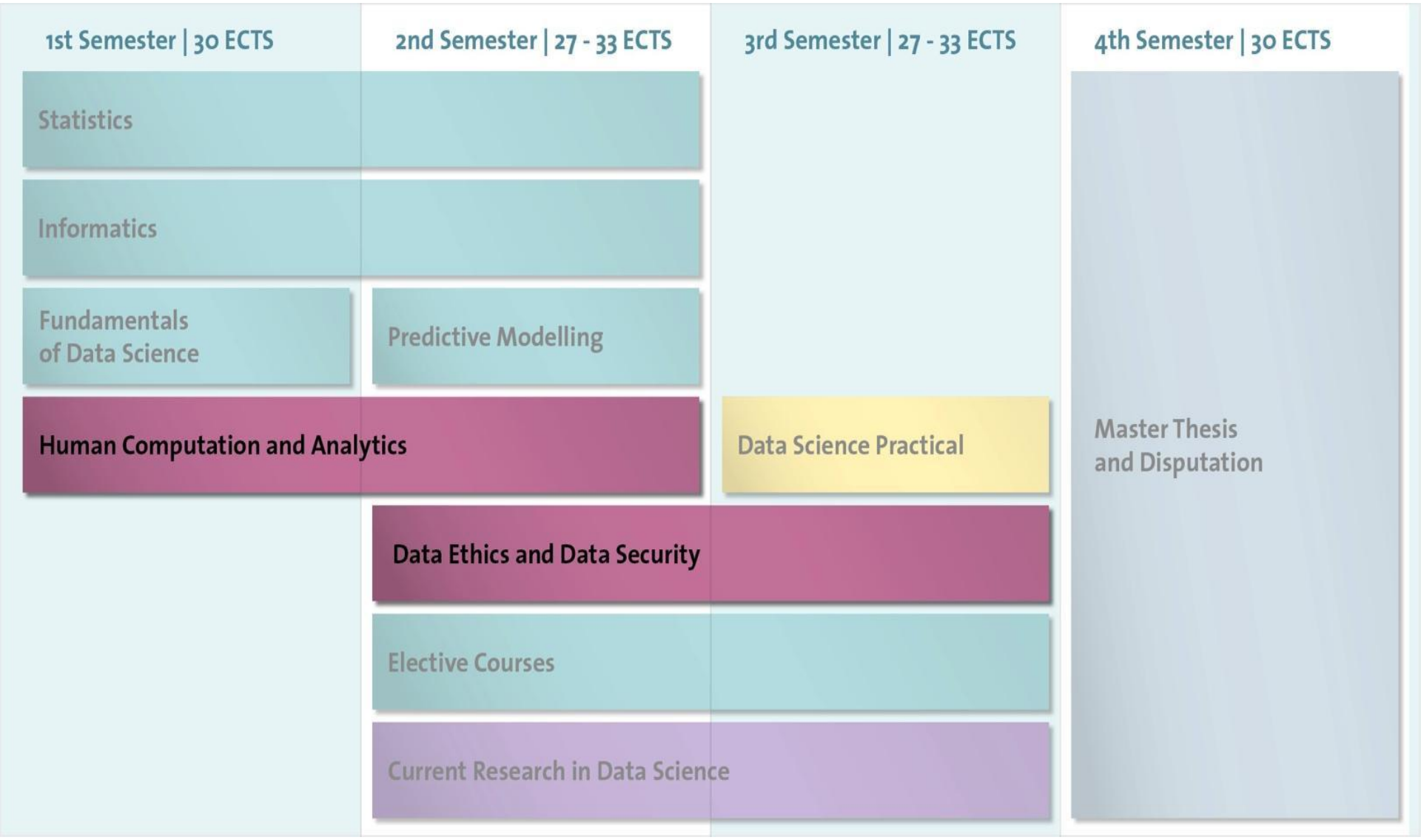
Fundamentals of Data Science (Individual Modules)

- Tailored to suit **individual student's needs**
- Students can choose courses from a variety of courses in **advanced methods of statistics and informatics**

→ Homogeneous level of expertise in both statistics and informatics even though students have different educational backgrounds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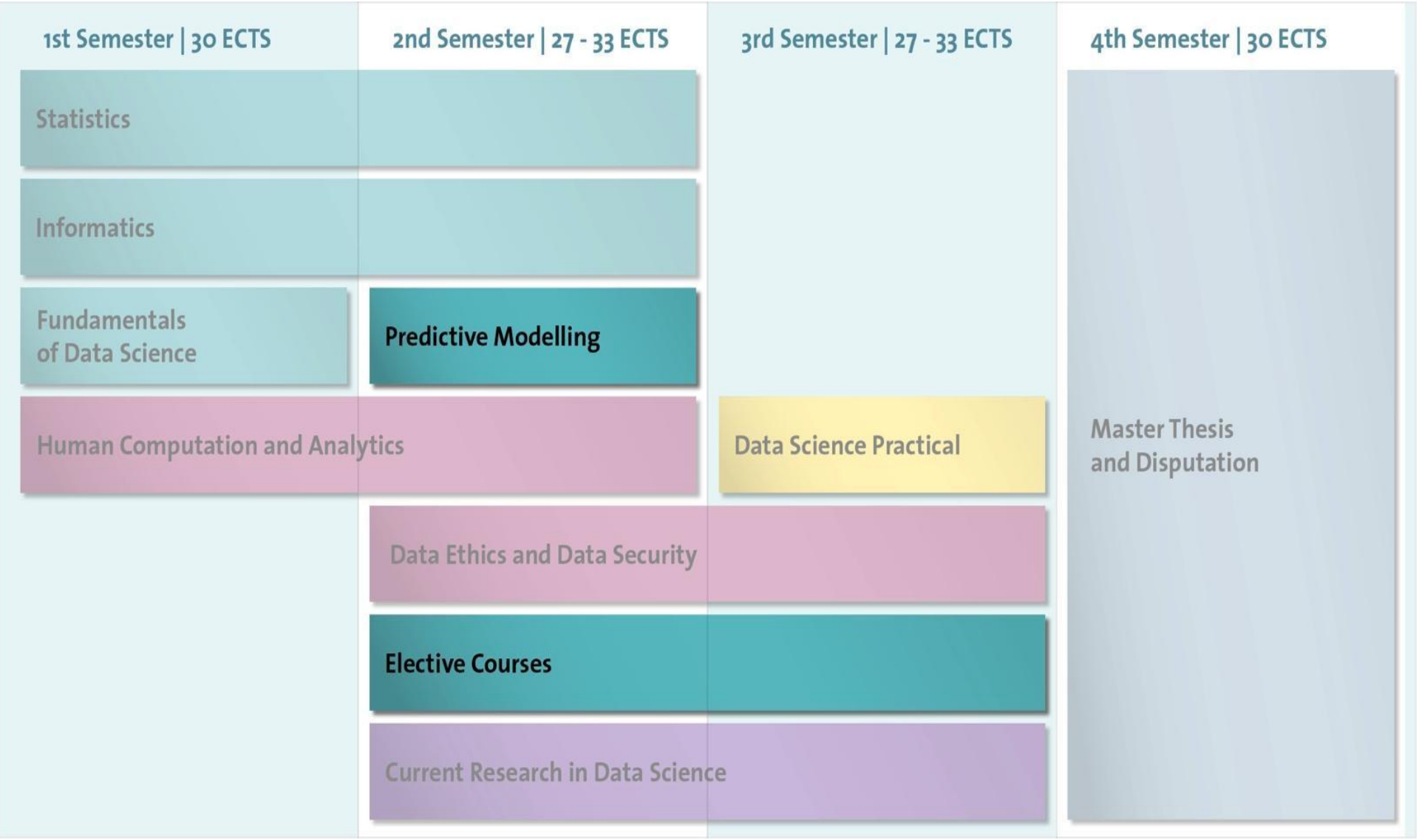
Human Computation and Analytics

- Includes a practical in which students will implement their own concepts for HC/VA systems in the form of a working prototype

Data Ethics and Data Security

- Methodological questions of data anonymisation
- Lecture series with (invited) talks on technical, ethical, and legal aspects of data security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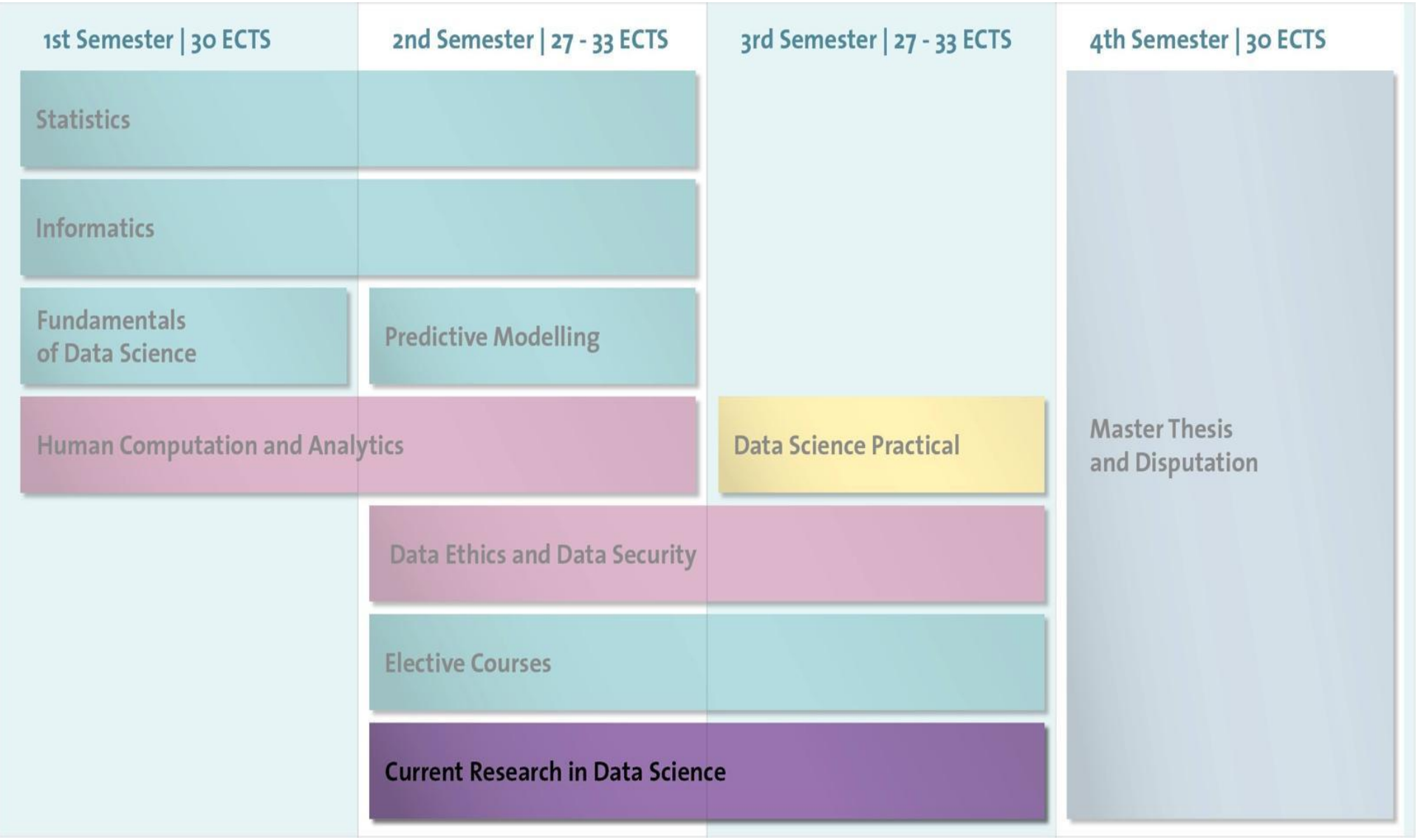
Predictive Modelling

- Training of theoretical and practical skills in non-linear and non-parametric methods

Elective Modules

- Courses from the regularly offered master courses in specialized fields in statistics, informatics, and computer linguistics, as well as master level courses at the partner universities, e.g. image processing and mathematical statistics at the Technical University Munich.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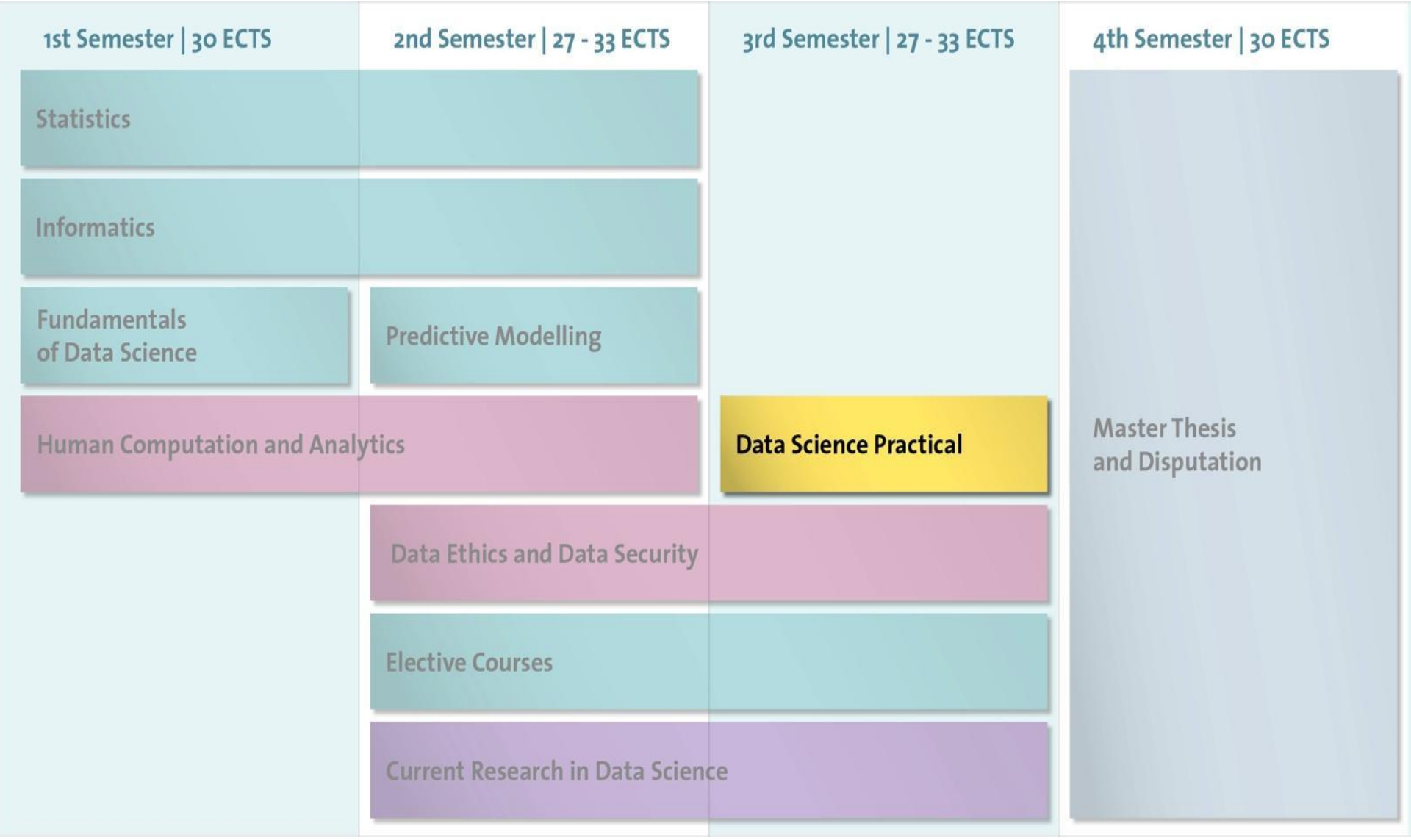
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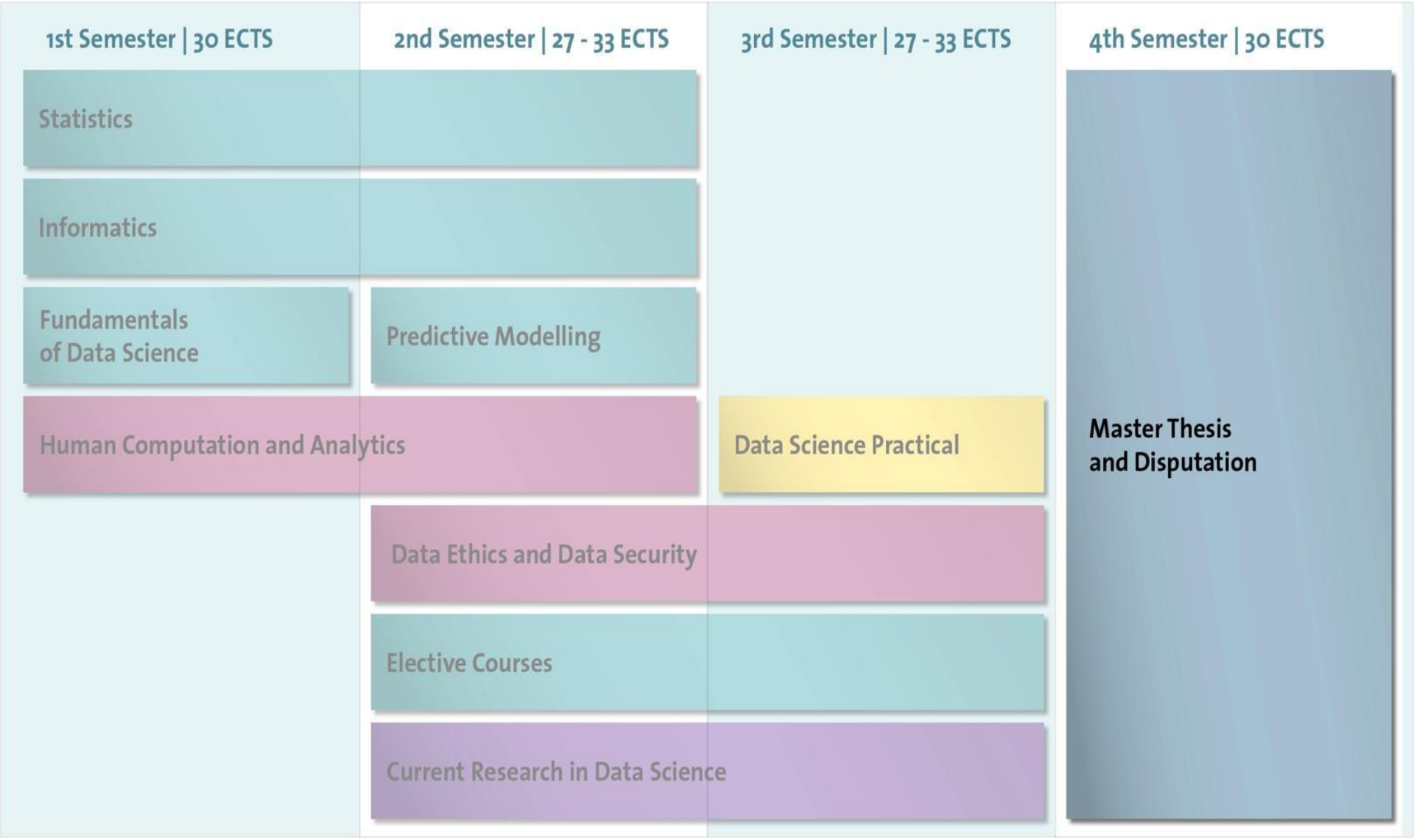
Data Science Practical

- Students work on practical problems in the field of Data Science
- Close cooperation with industry partners
- Focus on communicating results and findings to the client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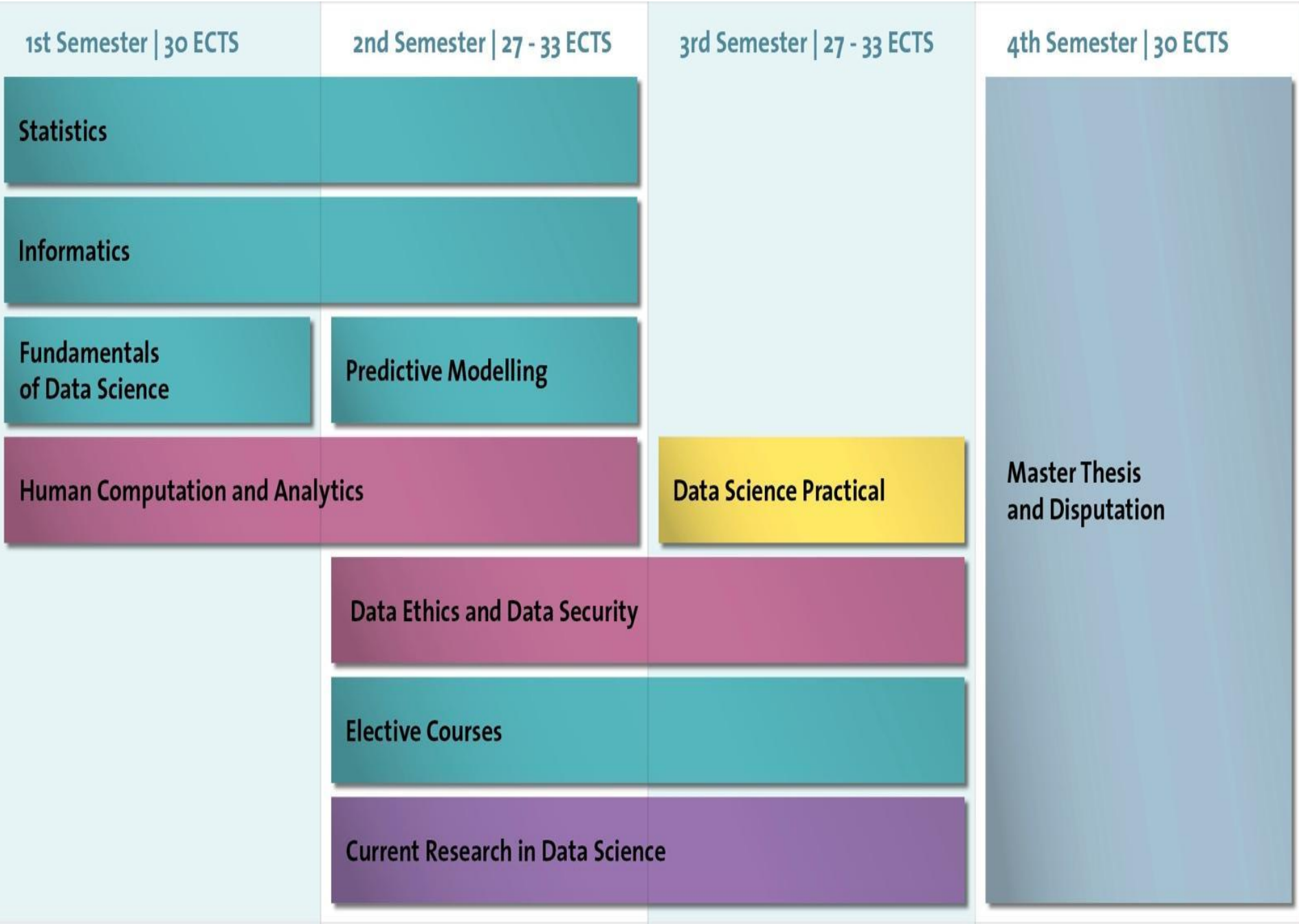
Master Thesis and Disputation

- Thesis may be either research-orientated or stimulated through a practical problem
- After submission → oral examination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Curriculum – Special Features

- Data Science Summer School

  Retreat with focus on data ethics and data confidentiality
- Data Science Tutorials

  Biosciences, E-commerce, networks, genomics etc.
- Data Science meets Data Practice

  Lecture series with professionals from industry and business
- Data Science Festival “DataFest”

  in cooperation with Universität Mannheim

Curriculum – Summary

- Modules **exclusively** for Data Science students
- **Individual Module** tailored to suit individual student's needs
- Courses on **data ethics, data confidentiality,** and **data security**
- **Data Science Practicals** – close cooperation with partners in industry and business
- Tutorials, Workshops, Summer Schools, …

Local Academic Ties

Universities

- TU München
- Universität Augsburg
- Universität Mannheim

Research Institutes

- Leibniz-Rechenzentrum
- HelmholtzZentrum München
- IAB Nürnberg
- MPI for Innovation and Competition
- Bayerisches Finanz Zentrum

Strong Industry Ties

Requirements and Application

Requirements for Application (1/4)

- Students with **excellent knowledge** in **informatics and statistics**
- Students not interested in specialising in **either Statistics or Informatics**
- **Bachelor of Science** (or equivalent) **in Statistics or Informatics** or related disciplines
  → **at least 180 ECTS** (or equivalent)
- Proficiency in **English**

Requirements for Application (2/4)

Students with **excellent knowledge** in **informatics and statistics**

- **Statistical Science and Data-Based Modelling:**
  This includes, in particular, statistics and topics such as data mining, probability theory, and machine learning (at least 30 ECTS or equivalent).
- **Computer Science and Computational Methods:**
  This includes, in particular, data structures and algorithms, database systems, programming principles and practice, software engineering (at least 30 ECTS or equivalent).

→ see also the **detailed list of topics for the interviews**

Requirements for Application (3/4)

- Students with **excellent knowledge** in **informatics and statistics**
- Students not interested in specialising in **either statistics or informatics**
- **Bachelor of Science** (or equivalent) **in Statistics or Informatics** or related disciplines
  → **at least 180 ECTS** (or equivalent)
- Proficiency in **English**

Requirements for Application (4/4)

Proficiency in English

- at least **B2 CEFR** (Common European Framework of Reference for Languages; or equivalent); or
- an English university entrance qualification; or
- first degree in English

Application Process – Dates and Deadlines

- **Step 1: Online application**

  mid-April – 1 June 2018

- **Step 2: Interview (in person or video-chat)**

  end of June 2018

  Invitations to the interview will be sent out by email at least one week before the interview date

Application– Step 1: Online Application (1/2)

1. **Transcript of records** (details see website)
2. **Copy of diploma** (may be submitted later)
3. **Essay "Data Science"**

   in which the student looks at the developments and perspectives of Data Science as well as his/her planned area of specialisation, and his/her previous experience (max. 1,000 words)
4. **Proof of proficiency in English**

You must fulfill all requirements if you want to apply.

Application – Step 1: Online Application (2/2)

Step 1 is successful if

- application is submitted before the deadline
- application documents are complete
- **overall average grade better than 1.5**
- requirements are fulfilled
- **essay** is approved by committee

→ **Invitation to interview (Step 2)**

Application – Step 2: Interview

- 30 minutes, in English
- two professors
- Discussion will focus on:

(1) **Statistics:** probability theory, standard distributions, maximum likelihood theory, Bayesian statistics, linear regression models

(2) **Informatics:** data structures and algorithms, database systems, programming and software engineering

(details see website)

→ Assessment of specialised knowledge, mode of expression, conclusiveness of arguments

Successful Application

Your application is successful
if Step 2 is successful

→ **Letters of acceptance**
will be sent out by email in
mid-July 2018

Interested – but not sure about your qualifications ?

- Individual consulting possible
- Remember: You may also apply next year

General information (for international students) on LMU Munich / Munich

…on the LMU homepage, e.g.

- **Costs/scholarships**

  https://www.en.uni-muenchen.de/students/int_student_guide/before_you_arrive/budgeting/index.html

- **Housing**

  https://www.en.uni-muenchen.de/students/exchange/incomings/austausch_engl/living/accommodation/index.html

Spokespersons

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