Orientation of the Master's Programme in Data Science
/ Pirjo Moen
OUTLINE

• Welcome
• Who we are?
• Departments related to the Programme
• Student organisations (TKO-äly, Matrix, Moodi) and CS alumni
• Academic mentoring
• University of Helsinki in brief
• Master’s Programme in Data Science
  o Degree structure
  o Studies in the programme
ACADEMIC MENTORING
ACADEMIC MENTORING IN DATA SCIENCE

- **Goals:**
  - Help students plan studies and long-term career perspectives;
  - Give students an academic point of contact for discussion

- **Activities:**
  - Individual meetings with the mentor
  - Group meetings

- **Will be started** in Data Science Fest on **Friday 6.9.2019**
TOP RANKING UNIVERSITY

• The best ranked university in Finland
  o In international rankings constantly in the Top 100
• The oldest and largest university in Finland
  o Over 31 000 degree students – 6% international
  o Over 7 800 employees
  o Around 5 500 degrees/year
  o Around 450 PhDs/year
  o 11 faculties and 4 campuses within Helsinki
• Wide range of studies in English
  o Master’s, doctoral, exchange, summer school, visiting…
FACULTY OF SCIENCE, KUMPULA CAMPUS

EXACTUM
- Department of Computer Science
- Department of Mathematics and Statistics

PHYSICUM
- Department of Geosciences and Geography
- Department of Physics
- Institute for Atmospheric and Earth System Research (INAR)
- Kumpula Campus Library

CHEMICUM
- Department of Chemistry
DEPARTMENT OF COMPUTER SCIENCE

• Leading institution in Computer Science in Finland
• Students and employees in 2018
  o Around 1,700 students
  o 196 staff members (about 33% international, about 15% female)
• Part of the Faculty of Science
• Located in Exactum
DEPARTMENT OF MATHEMATICS AND STATISTICS

- Largest university department for mathematical sciences in Finland
- Students and employees in 2018
  - Around 1,600 students
  - 137 staff members (about 26% international, about 29% female)
- Part of the Faculty of Science
- Located in Exactum
DEPARTMENT OF PHYSICS

- One of the largest departments at the University of Helsinki, and the largest of its kind in Finland
- Students and employees in 2018
  - Around 750 students
  - 183 staff members (about 25% international, about 19% female)
- Part of the Faculty of Science
- Located in Physicum
MASTER’S DEGREE IN DATA SCIENCE

• 2-year master’s degree programme

• Three departments involved
  o Department of Computer Science
  o Department of Mathematics and Statistics
  o Department of Physics

• Strongly science and research oriented programme
DEGREE STRUCTURE

Master’s degree in Data Science (120 cr)

- Advanced studies in Data Science (at least 85 cr)
  - Core studies (35 cr)
  - Specialization studies (20 cr)
  - Master’s thesis (30 cr) and Maturity test
- Other studies (up to 35 cr)
CORE STUDIES

- The core studies consist of 35 credits worth of compulsory key courses:
  - DATA11001 Introduction to Data Science (5 cr)
  - DATA11002 Introduction to Machine Learning (5 cr)
  - DATA11003 Distributed Data Infrastructures (5 cr)
  - DATA11006 Statistical Data Science (5 cr)
  - DATA11005 Data Science Seminar (5 cr)
  - DATA11004 Data Science Project I or some other project (5 cr)
  - DATA11100 Academic Skills for Data Science (5 cr)
  - DATA00000 Data Science Fest (0 cr)
SPECIALIZATION STUDIES

- At least 20 credits for data science specialization courses
- Currently, divided thematically into following five key areas of data science:
  - Algorithmic data science
  - Computer and cognition
  - Data science infrastructures
  - Machine learning
  - Statistical data science
- Most of the courses are worth 5 credits
MACHINE LEARNING

• Core course:
  o DATA11002 Introduction to Machine Learning (5 cr)

• Elective courses:
  o DATA12001 Advanced Course in Machine Learning (5 cr)
  o DATA12002 Probabilistic Graphical Models (5 cr) **
  o MAST32001 Computational Statistics I (5 cr)

DATA + MAST

** = not given 2019-2020
STATISTICAL DATA SCIENCE

• Core course:
  o DATA11006 Statistical Data Science (5 cr)

• Elective courses:
  o MAST32001 Computational Statistics I (5 cr)
  o MAST32005 Spatial Modelling and Bayesian Inference (5 cr) **
  o MAST32004 Advanced Bayesian Inference (5 cr)
  o MAST32006 High Dimensional Statistics (5 cr)
  o MAST31401 Inverse Problems 1: Convolution and Deconvolution (5 cr)

DATA + MAST

** = not given 2019-2020
DATA SCIENCE INFRASTRUCTURES

- Core course:
  - DATA11003 Distributed Data Infrastructures (5 cr)

- Elective courses:
  - DATA14001 Big Data Frameworks (5 cr) **
  - DATA14002 Introduction to Big Data Management (5 cr)
  - CSM13103 Cloud and Edge Computing (5 cr)
  - MATR322 Scientific Computing III (10 cr) **
  - MATR326 Tools for High Performance Computing (5 cr)

DATA + CSM + MATR ** = not given 2019-2020
COMPUTERS AND COGNITION

• No core courses

• Elective courses:
  o DATA15001 *Introduction to Artificial Intelligence* (5 cr)
  o DATA15002 *Computational Creativity* (5 cr) **
  o DATA15003 *Interactive Data Visualization* (5 cr)
  o LDA-C5009 *Philosophy of Artificial Intelligence* (5 cr) **
  o LDA-C5010 *Perception, Communication and Cognition* (5 cr) **
  o LDA-C5011 *Cognition & Brain Function* (5 cr) **

DATA + LDA-C

** = not given 2019-2020
ALGORITHMIC DATA SCIENCE

- No core courses

- Elective courses:
  - CSM12101 Design and Analysis of Algorithms (5 cr)
  - CSM12102 String Processing Algorithms (5 cr) **
  - CSM12103 Data Compression Techniques (5 cr)
  - DATA16001 Network Analysis (5 cr)

CSM + DATA

** = not given 2019-2020
ACADEMIC SKILLS FOR DATA SCIENCE

• A compulsory course module for 5 credits

• Consists of three courses
  o DATA11101 Orientation to Data Science Studies (1 cr)
  o 993734 Academic Writing for Students in English-Medium Master's Degree Programmes 1 (2 cr)
  o 993735 Academic Writing for Students in English-Medium Master's Degree Programmes 2 (2 cr)

DATA + Language centre
DATA SCIENCE SEMINARS

• One seminar is compulsory, two can be included to the degree

• Basically, all data science related seminars are suitable for this purpose

• Seminars are organised by
  o Master’s Programme in Data Science, or
  o Master’s Programme in Computer Science
DATA SCIENCE PROJECTS

• One project is compulsory, two can be included to the degree

• Solving practical data science challenges in a team

• Projects are organised by
  o Master’s Programme in Data Science, or
  o Master’s Programme in Linguistic Diversity in the Digital Age
MASTER’S THESIS + MATURITY TEST

• Master’s thesis is worth of 30 credits
• MSc thesis should demonstrate
  o the ability for scientific thinking,
  o command of scientific methods,
  o conversance with the topic of the thesis, and
  o aptitude for scientific communication.
• Thesis work takes usually half a year, and the result is a scientific study of 40-60 pages
  o Can be literature survey, experimental evaluation, development of a software tool, new theoretical research, etc.
• Maturity test = Abstract of the thesis
DATA SCIENCE FEST

• Monthly meeting of the programme on Fridays at 14.15-16.00 in Exactum D122
  o Autumn 2019: 6.9., 11.10., and 22.11.

• Programme can include, for example,
  o Master’s thesis presentations
  o PhD student presentations
  o Research talks
  o Project presentations
  o Invited talks
STUDY PACKAGES FOR OTHER PROGRAMMES

- DATA90001 Basics of Data Science (15-25 cr)
- DATA90002 Basics of Artificial Intelligence (15 cr)
- DATA90003 Basics of Data Science and Artificial Intelligence (25-35 cr)
- DATA90004 Machine Learning (15 cr)
- DATA90005 Data Science Infrastructures (15 cr)
PERSONAL STUDY PLAN (PSP, HOPS)

- The size of the MSc degree is 120 credits
- The optimal study time is 2 years
  - 2 years = 4 terms
  - About $120/4 = 30$ credits per term
- A course that yields 5 credits requires, for example, a minimum of about 125 hours of work

- Advice in making a PSP in Data Science:
  - Education Coordinator Reijo Sivèn, reijo.siven@helsinki.fi, D239
  - Research Coordinator Pirjo Moen, pirjo.moen@helsinki.fi, D242
PLANNING YOUR STUDIES

• Instructions for students
  o https://guide.student.helsinki.fi/en
  o Your guide to the university, studies and student life

• My studies
  o https://student.helsinki.fi/info/login
  o Course information, your personal course calendar and course materials

• SIS Tool for making the personal study plan
  o https://sis-helsinki.funidata.fi/
  o More about this in course Orientation to Data Science Studies
IMPORTANT AND USEFUL LINKS

• The general orientation pages of the university

• Web pages of the programme

• In case you cannot participate the Welcome Fair:
ABOUT USER ACCOUNTS

• University-level account (ad-account)
  o Mailbox: firstname.lastname@helsinki.fi
  o Used in university-level services

• CS department account (cs-account)
  o Activate only, if you need it!
  o Mailbox: firstname.lastname@cs.helsinki.fi
  o To activate your CS account, logon to http://www.cs.helsinki.fi/passwd with your university username and password

• Use the same password for both accounts
• The university and CS usernames are the same
STARTING YOUR STUDIES

• Activate your user account(s), if you have not done that already

• Make your study plan, at least for Period 1, if you have not done that already
  o Note that there is no rush to do the study plan with the SIS tool yet!

• Enrol to courses in WebOodi
  o Enrolment for courses on Period 1 has already started
KEY PERSONS

• Programme Director, Professor Jussi Kangasharju
• Programme Vice-Director, Associate Professor Antti Honkela
• Academic Coordinator, Dr. Pirjo Moen
• Education Coordinator Reijo Sivèn
• Project Planner Tiina Rytty

• Service address: data-science-studies@helsinki.fi
FINNISH WINTER IS COMING – PREPARE MENTALLY FOR IT

- September: Sun shines, nice temperature, some rain
- October: A lot of rain, first snowstorms, no snow cover, but can be icy
- November: Very short days and cloud cover, a lot of rain or snow, or wet snow, or… usually no snow cover in Helsinki area
- December: Very, very short days, snow or wet snow, snow cover in Finland, might be also in Helsinki area
- January: Days slightly longer, snow cover also in Helsinki, Gulf of Finland ice covered
- February: Nice winter days, sun shine and blue sky, maybe even skating above sea
- March: Nice winter days, snow starts melting
- April: Days longer than nights, snow melts, still some snowstorms
- May: Long days, no snow, green trees and grass
LENGTH OF DAY

http://en.ilmatieteenlaitos.fi/length-of-day
WE WISH YOU SUCCESS IN YOUR STUDIES

AND

SEE YOU ON THURSDAY 29.8.2019 AT 10.00 IN D123!