Master of Data Science for Public Policy

Study, Examination, and Admission Rules

as of 08 December 2021 [1]

The Academic Senate of the Hertie School issued the following rules:

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[1] Resolution of the Academic Senate of the Hertie School. Approved by the Senate Chancellery of the Federal State of Berlin on 20.12.2021.

I. Study Rules

§ 1 Object

These study rules regulate the aim, structure and content of the study programme Master of Data Science for Public Policy (M.Sc.) offered at the Hertie School.

§ 2 Aim of the Study Programme

(1) The Master of Data Science for Public Policy programme addresses today's complex societal, political and global challenges, with a particular focus on evidence-based policy-making and data-driven solutions.

(2) The study programme aims to provide students with the knowledge, academic skills and technical abilities required for the professional qualification of young executives and analysts in politics, administration, business, and civil society. To this end, the study programme equips tomorrow's decision-makers and analysts with the rigorous academic training and transferable skills required to develop data-driven solutions for government, civil society and industry, and to leverage the data science toolkit in a socially responsible and ethically aware way.

(3) As a professional programme, the Master of Data Science for Public Policy combines academic excellence and problem orientation in its teaching content and formats.

(4) The study programme qualifies students for a career at the intersection of government, administration, business, and civil society. Graduates of the Master of Data Science for Public Policy programme are qualified to take up positions in:
   - federal and local government,
   - research institutions, think tanks, or consulting firms,
   - non-governmental organisations,
   - private companies,
   - other (international) organisations requiring competence in quantitative analysis and data analysis, as well as knowledge of policy-making, policy domains and governance.

   The graduates are also qualified to pursue a doctoral degree.

§ 3 Structure and Contents of the Study Programme

(1) To complete the study programme, a total of 120 credit points must be earned from the following modules:
   1. Foundations of Data Science
   2. Foundations of Public Policy
   3. Tools of Data Science
   4. Professional Development
   5. Advanced Tools of Data Science
   6. Governance & Management for Data Science
   7. Portfolio
   8. Master`s Thesis

(2) Credit points according to the European Credit Transfer System (ECTS) indicate the workload normally required for students to fulfil the defined requirements and qualification targets in a module unit. In addition to the regular and active participation in the study units, the workload also includes course preparation and follow-up, as well as assignments. A credit point corresponds to a student workload of 30 hours.

(3)   Modules are topically and chronologically self-contained study units for which credit points are awarded. Modules are designed in such a way that they can be completed within one year and include a workload of at least 5 credit points. Within one year of study, 60 credit points should be earned.

(4)   Core Curriculum

The first year of study provides students with the essential knowledge, tools and skills to understand, analyse and evaluate public policy from different disciplinary perspectives, and with the foundations underlying the handling and use of data in contemporary data science. Students obtain a foundation in policy-making, law, and economics; acquire the foundations of data science; and learn about a variety of methodologies and techniques for data collection, transformation and analysis, and their applicability in public, private or non-profit settings (Modules 1-3). The professional development module complements this foundation by providing students with insights into the day-to-day work of an institution active in the field of public policy and data science, and by developing and honing their professional skills (Module 4).

(5)   Advanced Curriculum

In the second year of study, students practice the tools and deepen the knowledge acquired in the first year. The skills acquired in data science are deepened in a minimum of two advanced electives (Module 5), and are both applied and critiqued in the area of governance and management (Module 6). Students can choose to further deepen their data science training in two additional courses, or to expand their knowledge in two courses from the Hertie School`s broad portfolio of electives (Module 7). At the same time, students work on their Master's thesis, proving the ability to work academically and apply their theoretical knowledge to develop a data-based solution of a political or societal problem (Module 8).

(6)   The recommended course of study is specified in the study plan (Appendix 1). Additional details on qualification objectives, teaching content, and student workload of the different modules and module units are specified in the module handbook (Appendix 2).

§ 4 Teaching Formats

(1)   In the core curriculum, lectures give a broad overview of relevant models, concepts, basic methods, and disciplinary thinking in the core fields of the programme. Lectures are typically complemented with lab sessions which give students the opportunity to discuss and elaborate upon topics addressed in the lecture in small interactive groups.

(2)   Seminars in the core curriculum introduce students to relevant models, concepts, basic methods, and disciplinary thinking in core fields of the programme. Teaching is based on the active participation of students and the interaction between lecturer and participants.

(3)   Seminars in the advanced curriculum are offered by different lecturers, thus providing diverse perspectives and learning experiences for the students: Faculty members usually base their seminars on on-going research interests, thus linking teaching to cutting-edge research in policy, governance and data science. Guest lecturers from academia or think tanks present additional academic perspectives to the students. Practitioners offer direct insights into concrete public policy problems from the perspective of a policy actor and introduce students to the use of data in solution-focused debates in real-world environments. Tools-oriented seminars familiarise students with methods of data analysis and provide students with the opportunity to put these methods into practice.

(4)   An additional teaching format is used in the professional development module. Skills workshops are offered as intensive multiday seminars and develop the students' professional skills to facilitate their entry in the job market. Students also directly apply the knowledge acquired in an internship.

II. Examination Rules

§ 5 Object

These Examination Rules regulate the study and examination requirements (requirements) and their grading, students' formal study obligations, criteria of academic integrity as well as organisation and procedures of the Examination Committee for the Master of Data Science for Public Policy (M.Sc.) programme offered at the Hertie School.

§ 6 Examination Committee

(1)   An Examination Committee is established to fulfil all duties relevant to the course of studies and the examinations. The Committee consists of three members of the core faculty,[2] including one professor serving as dean of Graduate Programmes who chairs the Committee, as well as the person responsible for the Examination Office in the administration, and one student representative.

(2)   The Academic Senate of the Hertie School elects the faculty members for a two-year term and the student representative for a one-year term. Re-election is possible.

(3)   The Examination Committee meets *in camera* and decides by majority vote. The members of the Committee are obliged to maintain secrecy with regard to all matters becoming known to them in their capacity as members of the Committee as far as such information concerns any individual students.

(4)   The Examination Committee ensures the compliance with the Examination Rules.

(5)   The Examination Committee makes and accepts suggestions for the further development of the Examination Rules.

(6)   The Examination Committee shall decide in all cases of doubt concerning the application and interpretation of the Examination Rules.

§ 7 Examination Office

(1)   The Examination Office in cooperation with the Examination Committee shall be responsible for the organisation and coordination of the examination system, including the issue of the final transcript, the degree certificate, and the diploma supplement.

(2)   As a rule, the Examination Office will carry out the administrative actions of the Examination Committee, as well as all official announcements.

§ 8 Organisation of the Study Programme

(1)   The language for teaching and for all requirements of the study programme is English.

(2)   The study programme is full-time and consists of four study semesters as well as an internship of at least six weeks full-time or 10 weeks part-time of at least 20 hours/week. The study programme is, in principle, taught during two consecutive academic years. The internship is completed between the first and second year of study and may be replaced by a professional activity relevant to the study programme of up to one year.

(3)   The Examination Committee may permit an interruption of the study programme for programme related professional reasons so long as the goals of the programme are not put at risk. The programme can only be interrupted after the first year of study at the Hertie School and for a period of 12 months at the most. A written request has to be submitted to the Examination Committee at

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[2] The core faculty consists of all professors employed at the Hertie School.

least three months prior to the beginning of the new semester. The possibility to interrupt the study programme for health or care-giving reasons shall remain unaffected by this regulation.

(4)   Upon written request, the Examination Committee can permit that the study programme is extended and organised on a part-time basis for students with serious health problems, disabilities, or other situations such as for care-giving or professional reasons.

§ 9 Recognition of Credits and Crediting of Competences

(1)   Credits earned by a student at another university may be recognised upon application and approval by the Examination Committee. The Committee shall approve if there are no major differences with regard to study contents, learning objectives, and workload of the respective requirements.

(2)   A student's professional competences shall be credited up to one half of the credits required for the study programme upon approval by the Examination Committee. The Committee shall approve if the professional competences are relevant in respect to contents and learning objectives.

(3)   Recognition and crediting against individual parts of an examination shall be excluded.

(4)   Study and examination requirements, and competences which have already been credited for a bachelor degree cannot be recognised for credit. Students who participate in the Dual Degree programme shall remain unaffected by this regulation.

(5)   If an examination has been passed and recognised it shall be deemed passed.

(6)   The decision on the recognition/crediting shall be made on the basis of adequate information concerning the qualification to be recognised/credited. The student shall be responsible for submitting the required documents and relevant proof.

(7)   When examination requirements are recognised, the grades shall as far as mathematically possible be transferred and taken into account when calculating the final grade. In exceptional cases, the examination requirement shall be recognised as "pass" or "fail" without transferring the grade. The final grade of the degree shall then be calculated without taking the recognised examination requirement into account.

§ 10 Students' Formal Obligations

(1)   Participation in all courses during the entire semester is mandatory. In case of non-attendance, students shall submit a written explanation to their course lecturer in advance. The lecturer shall decide on the justification of the reasons given. In cases of more than two missed course sessions, the lecturer shall decide if the student fails the course or if they can meet the learning objectives by fulfilling additional requirements.

(2)   Students are obliged to observe the deadlines set for requirements. If a deadline is missed, the respective requirement will usually be graded "fail". In well-founded cases, the lecturer can accept a late assignment and decide on a grade reduction following defined criteria.

(3)   In case of non-attendance of examinations, students have to inform the Examination Office immediately about the reasons and furnish proof thereof in writing, this shall also apply in case of delays. In case of illness, a medical certificate must be submitted without prior request. An inability to participate in an examination must be proven specifically, a certificate of inability to work shall not be sufficient in this respect. Illness of a child of whom he or she is generally the sole caregiver, or illness of a first-degree relative or life partner shall be considered as equivalent to the illness of the student him or herself.

§ 11 Grading

(1) Examinations shall be assessed with the following grades: 1 = very good (for outstanding performance); 2 = good (for performance considerably above average); 3 = satisfactory (for an average performance in all respects); 4 = sufficient (for a performance that is in accordance with the requirements, despite deficiencies); 5 = not sufficient (for a performance with considerable deficiencies, which is not in accordance with the requirements). For more differentiated grading, intermediate grades can be formed by decreasing or increasing the grades by 0.3: $1.0 - 1.3 - 1.7 - 2.0 - 2.3$, etc.

(2) In individual modules, individual examination requirements may be merely graded "pass" or "fail".

(3) For assignments, a percentage grade may be allocated according to the degree of performance of the respective requirement. The percentage grade shall be converted into a grade according to the following scale:

   100-96% = 1.0
   95-91% = 1.3
   90-86% = 1.7
   85-81% = 2.0
   80-76% = 2.3
   75-71% = 2.7
   70-66% = 3.0
   65-61% = 3.3
   60-56% = 3.7
   55-50% = 4.0
   49-0% = 5.0

(4) For examinations which are assessed by more than one grader, the cumulative grade shall be the average of the individual grades.

(5) Cumulative grades consisting of the grades for several assignments shall be calculated as the weighted average of the individual grades. Cumulative grades will be shown in the transcript with one digit behind the comma. All other digits will be deleted without rounding. The final grade (Grade Point Average - GPA) shall be calculated as the weighted average of the module grades. Weighted grades shall consist of the grade points for the respective modules. Assignments that have been graded "pass" or "fail" shall not be taken into account.

(6) The average grades according to paragraphs 4 and 5 are defined as follows:
   1.0 up to and including 1.5 = very good
   1.6 up to and including 2.5 = good
   2.6 up to and including 3.5 = satisfactory
   3.6 up to and including 4.0 = sufficient
   above 4.0 = not sufficient.

§ 12 Repetition of Examinations

(1) Examinations that have been passed cannot be repeated. An examination shall be deemed passed if it has been graded at least "sufficient" (4.0). For examinations which are not assessed with a numerical grade it must be proven that the examination has been assessed as "pass".

(2) Failed examinations can be repeated twice. In such a case, students shall be given the opportunity to repeat the failed assignment which led to the failed examination, at the latest at the beginning of the semester following the examination.

(3) For the final attempt at an examination requirement, the Examination Committee shall appoint two graders.

(4)   The regulations concerning the Master's thesis in § 15 para. 4 shall remain unaffected.

§ 13   Students' Right of Appeal, Assertion of Disturbances

(1)   If a student feels she/he has not been treated fairly or graded accurately, the student can request a review with the respective lecturer within 6 weeks after notification of the grade.

(2)   If the appeal is not redressed by the lecturer, the student shall have the right to submit a written appeal to the Examination Committee. The Committee shall request the lecturer to review the grade for the respective requirement. Another grader shall be appointed by the Examination Committee if the lecturer is not available or has a conflict of interest.

(3)   The student's grades for the respective assignment can go up, down, or stay the same upon review.

(4)   Disturbances during the examination must be asserted without delay.

§14 Compensation for Disadvantages

(1)   If a student furnishes evidence that he or she is not able to take an examination as required in whole or in part due to disability or permanent illness, the Examination Committee may upon written request approve learning accommodation(s).

(2)   The right to make use of the protection periods according to the German Maternity Leave Act (*Mutterschutzgesetz*) or Federal Child-Raising Allowance Act (*Bundeserziehungsgeldgesetz*) shall apply accordingly.

(3)   In this respect, the submission of adequate certificates may be required.

§ 15   Master's Thesis

(1)   Students work on their Master's thesis during their final year of study. With this thesis, students show that they are able to independently develop and execute a research project in data science on the basis of scientific methods and findings within a period of 5 months.

(2)   The Master's thesis shall be supervised by a member of the core faculty. In well-founded cases, the Examination Committee can appoint a member of the extended faculty as thesis supervisor.

(3)   The Master's thesis is graded by the Master's thesis Committee which consists of the thesis supervisor and one other member of the core or extended faculty. The Master's thesis is passed if the cumulative grade according to § 11 para. 4 is at least "sufficient" (4.0).

(4)   When submitting the Master's thesis, each student must make a written declaration that she/he worked on the thesis independently and did not use any other sources and means than those indicated. One hardcopy of the Master's thesis and an electronic copy must be submitted to the Examination Office.

(5)   Content, methodology and research results of the Master`s thesis are also to be presented in the form of a poster. The poster is graded "pass" or "fail" according to § 11 para 2. One hardcopy of the poster in size DIN-A1 and an electronic copy must be submitted to the Examination Office.

(6)   The submission date of the Master`s thesis and poster shall be determined for each academic year by the Examination Committee. The deadlines shall be recorded.

(7)   Students who fail their Master's thesis can repeat it once. A new submission date shall be set by the Examination Committee.

(8)   Students can work in teams on their Master's thesis. It has to be ensured that all members of the team contribute to the thesis in equal parts. The students shall indicate which sections of the thesis they wrote.

§ 16 Good Academic Conduct

(1) The Hertie School is committed to the standards of good academic conduct. Any violation of these standards shall be subject to sanctions.

(2) Infringements of the standards of good academic conduct include for instance

   a) to use wordings, ideas or other intellectual work of others in an academic work without clearly indicating the author. The obligation to indicate the authorship of others shall apply irrespective of whether or not the sources used are protected by copyright;

   b) to deceive, or try to deceive about examinations or assignments, or in the conduct with students, lecturers, administration, or partners of the Hertie School;

   c) not to contribute the part of work agreed on and to be contributed according to the principles of fair cooperation in group works which are subject to performance assessment.

(3) In case of a suspected violation of the standards of good academic conduct, the lecturer shall submit the matter to the Examination Committee.

§ 17 Infringement of the Standards of Good Academic Conduct

(1) If the Examination Committee suspects an infringement of the standards of good academic conduct, it shall initiate the following proceedings:

   1. inform the student of the allegations in written form and provide them with the opportunity to give their opinion on the allegations

   2. prepare a written summary of the facts including the comments of all parties involved.

(2) If the Examination Committee comes to the conclusion that the accused student has not committed any breach of the principles of academic integrity this shall be declared in a formal resolution.

(3) If the Examination Committee determines any violation of the standards of academic integrity, it shall recommend the following sanctions, taking account of the principle of proportionality:

   a) grade reduction for the respective assignment,
   b) failure of the respective assignment,
   c) failure of the entire examination,
   d) In case of particularly severe, repeated or multiple violations of the standards of academic integrity, the student shall be expelled from the Hertie School.

(4) The decision on sanctions according to para. 3, lit. a) to c) shall be taken by the Examination Committee. The decision on the sanction under para. 3 d) shall be taken by the Examination Committee in agreement with the President of the Hertie School. The respective sanction has to be justified and communicated to the student in written form.

(5) If a deception only becomes known after the degree documents have been issued in accordance with § 20, the academic degree may be revoked in accordance with the provisions of state law.

§ 18 Removal from the Register of Students

(1) In case of graduation students shall be removed from the register of students at the end of the academic year of their second year of study.

(2) A premature removal from the register shall take place if an examination is irrevocably graded 'fail' as well as if the student is expelled from the Hertie School due to violation of the standards of academic integrity in accordance with the proceedings under § 17 or due to violation of standards regulated in the Hertie School's Code of Conduct.

(3)   Students who cannot study due to health problems or for caregiving reasons can remain enrolled for four semesters at the most. After four semesters they will be removed from the register of students. They can request to be re-enrolled to continue their studies and complete their degree within a period of two years after their removal from the register of students. The Examination Committee can require the respective student to adapt their study plan.

§ 19 Academic Degree

The academic degree "Master of Science" is awarded to candidates who have accomplished all assignments and examinations in the programme. In case of an agreement on a dual degree programme with a partner university, the credits earned at the partner university shall be accepted for transfer to the Hertie School for the Master of Data Science for Public Policy degree by the Examination Committee according to §9 para. 1.

§ 20 Degree Certificate and Final Transcript

(1)   Students shall receive a certificate with the awarded degree and the completed study programme at the Hertie School. The degree certificate shall be signed by the President and the Chair of the Examination Committee and imprinted with the official seal of the Hertie School. The certificate shall bear the date of the last examination.

(2)   In addition to the degree certificate, students shall receive a transcript of records showing their final grade (Grade Point Average – GPA), the module grades, as well as the grades for all requirements including the ECTS credit points awarded for them. The transcript of records shall bear the date of the last examination, the seal of the Hertie School, and at least two additional security features.

(3)   A diploma supplement with additional information on the study programme shall be issued.

III. Admission Rules

§ 21 Object

These rules regulate the admission to the Master of Data Science for Public Policy programme offered at the Hertie School as well as the granting of scholarships for this programme.

§ 22 Admission Requirements

The admission requirements are

1. a bachelor's degree or equivalent qualification from a study programme of at least 6 semesters duration (180 ECTS credit points) at a German or foreign institution of higher education;

2. a high level of proficiency in written and spoken English, proven by one of the following language tests with the following minimum marks: TOEFL (PBT 600, CBT 250, iBT 100), IELTS (overall score of 7.0), Cambridge ESOL CPE C or CAE B.

Professional experience, extra-curricular activities and a technical or social science background are desirable for candidates who seek admission to the programme.

§ 23 Admissions Committee and Admission Criteria

(1) The Admissions Committee decides on admissions in accordance with the guidelines laid down by the President as well as on the basis of more detailed regulations to be decreed by the Committee.

(2) The Committee consists of at least six members of the Hertie School core faculty as well as of two members of the administrative staff in an advisory function. The members of the Committee are elected by the Academic Senate for one academic year respectively.

(3) The Admissions Committee shall decide on the basis of the documents submitted by the applicant and the results of an interview, if applicable. The following criteria are applied: Academic excellence, motivation as well as personal qualification.

(4) Successful applicants will receive a written notification of admission. With this notification the applicant will be given a deadline for acceptance of the offer of admission. The offer of admission shall expire after this deadline.

(5) Applicants who are not admitted to the programme shall receive a written notice of rejection.

§ 24 Scholarships

(1) Admitted applicants can apply for a scholarship for their studies at the Hertie School. Scholarships are provided in the form of full or partial tuition waivers.

(2) The Hertie School`s leadership decides on the provision of scholarships on the basis of the appraisals of the Admissions Committee.

IV. Final Provisions

§ 25 Coming into Effect

These rules come into effect upon their publication on 09 December 2021. At the same time, the MDS Study, Examination and Admission rules of 09 June 2021 will become invalid.

Appendix 1: Study Plan

Master of Data Science for Public Policy Programme (MDS)

Semester 1	Semester 2		Semester 3	Semester 4
Data Structures & Algorithms	Mathematics for Data Science		Advanced Tools Elective I	Governance & Management Elective II
Policy Process	Law & Governance	Internship	Advanced Tools Elective II	Portfolio Elective II
Economics	Causal Inference		Governance & Management Elective I	Master's Thesis
Introduction to Data Science	Machine Learning		Portfolio Elective I	
Skills Workshop I	Skills Workshop II		Master's Thesis Colloquium Master's Thesis Research	
25 ECTS	25 ECTS	10 ECTS	30 ECTS	30 ECTS
Year 1: 60 ECTS			Year 2: 60 ECTS	

Appendix 2: Module Handbook

Master of Data Science for Public Policy Programme (MDS)

Module Overview

Module	Study Units	Credits	Share of Final GPA*	Semester
I. Foundations of Data Science	1. Data Structures & Algorithms 2. Mathematics for Data Science	12	12%	1-2
II. Foundations of Public Policy	1. Policy Process 2. Economics I 3. Law & Governance	18	18%	1-2
III. Tools of Data Science	1. Introduction to Data Science 2. Causal Inference 3. Machine Learning	18	18%	1-2
IV. Professional Development	1. Skills Workshop I 2. Skills Workshop II 3. Internship	12	0%**	1-2
V. Advanced Tools of Data Science	1. Advanced Tools Elective I 2. Advanced Tools Elective II	12	12%	3
VI. Governance & Management for Data Science	1. Governance & Management Elective I 2. Governance & Management Elective II	12	12%	3-4
VII. Portfolio	1. Portfolio Elective I 2. Portfolio Elective II	12	12%	3-4
VIII. Master's Thesis	1. Master's Thesis Colloquium 2. Master's Thesis Research	24	16%***	3-4
∑		120	100%	

*   Grade Point Average
**   No graded study units
***   Results of numerically graded study units

Module Descriptions

Programme				Module I	
Master of Data Science for Public Policy				**Foundations of Data Science**	
Credits	12	**Length of Module**	2 semesters	**Module share of final grade**	12%
Module grade	Average of final grades of all numerically graded units.				
Units	1. Data Structures & Algorithms 2. Mathematics for Data Science				
Content & qualification objectives	Contemporary data science, at its core, requires a unique blend of statistical knowledge, programming skills and domain expertise of the specific industry in which it operates. This module builds up students' foundational understanding and intuition in the first two aspects of the discipline by introducing core concepts and best practices of computer programming and the mathematics essential for data science. Upon completing this module, students will have a broad and critical grasp of the mathematics underpinning modern machine learning and deep learning algorithms. This knowledge is key for subsequent modules. Students will also be able to utilise programming practices to solve coding challenges.				

Programme	Module I
Master of Data Science for Public Policy	**Foundations of Data Science**
Unit: Data Structures & Algorithms	
Content & qualification objectives	If programming is an art, then data structures and algorithms are the colours and strokes with which programmers display their craft. Data structures are the manner in which data is stored so that algorithms can operate on them. Algorithms, in turn, are instructions on how to handle data efficiently to achieve a desired result. This course begins with an introduction to fundamental programming concepts, presents basic ideas in data structures and algorithms, and considers how to write efficient code using established software engineering practices and paradigms, from test-driven development to object-oriented and functional programming. By the end of the course, students will be able to understand these elementary building blocks of programming, solve simple coding problems, evaluate complexity and efficiency of algorithms, and know the best use cases for each type of data structure.
Course type	Lectures and lab sessions.
Workload	35 hours presence (lecture: 20 hours; lab session: 15 hours), 145 hours for preparation and assignments.
Credits	6
Assignments[3]	Credits are allocated for 1-3 assignments to be completed during the semester: written assignments (e.g., mathematical or coding problem sets; research or analysis paper; technical report; data analysis exercises, data science project), oral presentation (optional), and written exam (optional).
Examination	The examination consists of different assignments assessed during the semester.
Grade	1,0 – 1,3 – 1,7 – 2,0 – 2,3, etc. (according to degree of performance), with a grade lower than 4,0 being "not sufficient" (fail).
Prerequisites	None.
Course cycle	Fall semester, mandatory in 1st year of study.
Usability	Master of Data Science for Public Policy.

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[3] See Annex at the end of this document for an overview and details on possible assignments.

Programme	Module I
Master of Data Science for Public Policy	Foundations of Data Science

Unit: Mathematics for Data Science	
Content & qualification objectives	Mathematics is foundational to data science. This course aims to deliver a compact and tailored introduction to the core mathematical concepts of data science. Linear algebra, probability and statistics, and optimisation are mathematical pillars underlying the practice of data science. The course covers the core concepts across these three pillars and accompanying modern computational tools of mathematics. Upon completing the course, students will have a broad understanding of linear algebra, probability and statistics, and optimisation necessary for data science.
Course type	Lecture, complemented by lab sessions.
Workload	35 hours presence (lecture: 20 hours; lab session: 15 hours), 145 hours for preparation and assignments.
Credits	6
Assignments	Credits are allocated for 1-3 assignments completed during the semester: written assignments (e.g., mathematical or coding problem sets; research or analysis paper; technical report; data analysis exercises, data science project), oral presentation (optional), and written exam (optional).
Examination	The examination consists of different assignments assessed during the semester.
Grade	$1,0 - 1,3 - 1,7 - 2,0 - 2,3$, etc. (according to degree of performance), with a grade lower than $4,0$ being "not sufficient" (fail).
Prerequisites	None.
Course cycle	Spring semester, mandatory in 1st year of study.
Usability	Master of Data Science for Public Policy.

Programme			Module II	
Master of Data Science for Public Policy			Foundations of Public Policy	
Credits	18	**Length of Module** 2 semesters	**Module share of final grade**	18%
Module grade	Average of final grades of all numerically graded units.			
Units	1. Policy Process 2. Economics 3. Law & Governance			
Content & qualification objectives	The MDS aims to produce expert data scientists who are able to apply, evaluate and navigate their expertise in a public policy context. No matter whether the programme's graduates go on to work in the public, private or third sector, they will need to understand how the decisions they take and the products they develop are affected by economic, political, administrative and legal opportunities and constraints, as well as by goal-seeking and value-driven actors, by institutions, and by political constellations. After completing this module, students will have gained a multi-disciplinary understanding of how collectively binding decisions are produced and analysed. More specifically, students will be qualified to understand the historical, conceptual, economic, and legal foundations of public policy; to analyse how public policies are shaped by different actors, institutions, and political, administrative, economic, and legal constellations; and to apply their knowledge to specific cases and issues in data science.			

Programme	Module II
Master of Data Science for Public Policy	Foundations of Public Policy

Unit: Policy Process	
Content & qualification objectives	This course introduces students to the policy process from a governance perspective. The course analyses political actors' capacity to design instruments in order to influence particular outcomes in different policy fields. Focusing on governance rather than governments, students gain a broad understanding about the range of relevant actors involved in the policy process. Students will acquire an in-depth understanding of policy instruments, implementation and evaluation, and of how to influence agendas, outcomes and reforms as future policy analysts and actors in the policy process. By the end of the course, students will be able to competently analyse policy-problems in 'real world' scenarios on the basis of concrete cases. Students will be able to grasp the constraints and opportunities present in different political environments, and to effectively contribute in both spoken and written formats to debates about public policy.
Course type	Seminar.
Workload	20 hours presence, 80 hours for preparation, 80 hours for assignments.
Credits	6
Assignments	Credits are allocated for 1-3 assignments completed during the semester, including written assignments (e.g., research paper, policy memo, literature review, essay), oral contributions (optional; e.g., participation or presentations), and written exam(s) (optional).
Examination	The examination consists of a set of different assignments assessed during the semester.
Grade	1,0 – 1,3 – 1,7 – 2,0 – 2,3, etc. (according to degree of performance), with a grade lower than 4,0 being "not sufficient" (fail).
Prerequisites	None.
Course cycle	Fall semester; mandatory in 1st year of study.
Usability	Master of Data Science for Public Policy, Master of Public Policy.

Programme	Module II
Master of Data Science for Public Policy	Foundations of Public Policy

Unit: Economics I	
Content & qualification objectives	Economics I provides an intensive introduction to a wide range of topics, models, and theories. It is suitable for students without a background in economics, but students with prior training will also benefit. The course focuses on core topics in economics such as supply and demand analysis, the roles of markets and prices, welfare analysis, competition, and monopolistic pricing, asymmetric information, externalities and government intervention, game theory and uncertainty, trade, labour market, and political economy. By the end of this course, students will understand the main theories, concepts and a number of models that are used in current economic analysis.
Course type	Lecture, complemented by lab sessions.
Workload	35 hours presence (lecture: 20 hours; lab session: 15 hours); 145 hours for preparation and assignments.
Credits	6
Assignments	Credits are allocated for 1-3 assignments completed during the semester, including exercises and written exams.
Examination	The examination consists of different assignments assessed during the semester.
Grade	1,0 – 1,3 – 1,7 – 2,0 – 2,3 etc. (according to degree of performance), with a grade lower than 4,0 being "not sufficient" (fail).
Prerequisites	None.
Course cycle	Fall semester, mandatory in 1st year of study.
Usability	Master of Data Science for Public Policy, Master of Public Policy, Master of International Affairs.

Programme	Module II
Master of Data Science for Public Policy	**Foundations of Public Policy**

Unit: Law & Governance	
Content & qualification objectives	This course aims to elucidate the relationship in modern societies between law and governance, i.e. between legal structures and rules, and decision-making. Law and Governance is divided into three main parts: 1) foundational legal techniques and sources, such as legal interpretation and argumentation; 2) the relationship between law and policy-making (i.e. the use of law both as a constraint upon and as a vehicle for public policy); and 3) the transnationalisation of modern law, and the impact of such transnationalisation on the law's form, structures and substance. By the end of the course, students will be qualified to understand the legal constraints and opportunities they may face as future analysts and actors in policy-making. Students will become competent in reading and applying legal sources, and in understanding the impact of law on decision-making at different levels of governance.
Course type	Seminar.
Workload	20 hours seminar, 80 hours seminar preparation, 80 hours seminar requirements.
Credits	6
Assignments	Credits are allocated for 1-3 assignments fulfilled during the semester, including written assignments (e.g., research paper, policy memo, literature review, essay), oral contributions (optional), and written exam(s) (optional).
Examination	The examination consists of a set of different assignments assessed during the semester.
Grade	$1,0 - 1,3 - 1,7 - 2,0 - 2,3$ etc. (according to degree of performance), with a grade lower than $4,0$ being "not sufficient" (fail).
Prerequisites	None.
Course cycle	Spring semester, mandatory in 1st year of study.
Usability	Master of Data Science for Public Policy, Master of Public Policy.

Programme			Module III	
Master of Data Science for Public Policy			**Tools of Data Science**	
Credits	18	**Length of Module**	2 semesters	**Module share of final grade**	18%

Module grade	Average of final grades of all numerically graded units.	
Units	1. Introduction to Data Science 2. Causal Inference 3. Machine Learning	
Content & qualification objectives	Data scientists are often in charge of collecting, transforming, pre-processing and generating insights from data. To perform these tasks, they need to be competent with a variety of statistical tools, methodologies and programming languages. This module equips students with the essential analytical instruments and methods for studying cause-and-effect relationships, tackling prediction tasks, and establishing a proper coding workflow. Building on Module I: Foundations of Data Science, this module comprises a number of courses that augment the students' knowledge base and experience in methodologies and techniques for data collection, transformation and analysis, while also illustrating their applicability in public, private or non-profit settings. Each course focuses on a specific area, from an in-depth look at data usage and management, to causal effect estimation, to generating insights using machine learning algorithms. By the end of the module, students will have gained an understanding of the whole pipeline of a data science project, will be familiar with current state-of-the-art tools and their key features for executing data operations, and will be prepared to undertake their own data science research.	

Programme Master of Data Science for Public Policy	Module III Tools of Data Science

Unit: Introduction to Data Science	
Content & qualification objectives	This course equips students with conceptual knowledge of the data science project lifecycle and enables participants to put this knowledge into practice with statistical software. The course focuses on introducing students to the principles of methods for storing and structuring data, database design, query languages, web APIs and cloud computing. Special attention is also given to building robust coding practice, version control, identifying potential data bottlenecks and finding solutions to these issues. By the end of the course, students will have solidified their coding workflow, have understood different types of data usage and database management, and can begin experimenting, collecting and wrangling data for independent analysis and research.
Course type	Lecture, complemented by lab sessions.
Workload	35 hours presence (lecture: 20 hours; lab session: 15 hours), 145 hours for preparation and assignments.
Credits	6
Assignments	Credits are allocated for 1-3 assignments completed during the semester: written assignments (e.g., mathematical or coding problem sets; research or analysis paper; technical report; data analysis exercises, data science project); oral presentation (optional); and written exam (optional).
Examination	The examination consists of different assignments assessed during the semester.
Grade	1,0 – 1,3 – 1,7 – 2,0 – 2,3 etc. (according to degree of performance) with a grade lower than 4,0 being "not sufficient" (fail).
Prerequisites	None.
Course cycle	Fall semester; mandatory in 1st year of study.
Usability	Master of Data Science for Public Policy.

Programme Master of Data Science for Public Policy	Module III Tools of Data Science

Unit: Causal Inference	
Content & qualification objectives	Public policy and data-driven organisations are complex arenas, and the ability to uncover causal connections rather than simple correlations is vital in evidence-based decision making. This course teaches the analytical framework of contemporary causal inference, which is connected to modern statistical and machine learning methods. The course covers a comprehensive array of topics and guidelines on designing and implementing causal evaluation research based on the latest methodologies. Special emphasis will be given to the application of causal analysis for policy makers and development practitioners. By the end of the course, students will be able to understand, analyse and suggest improvements for statistical techniques and causal identification strategies implemented in existing research, and will begin conducting their own independent causal analysis, forming hypotheses and testing their validity.
Course type	Lecture, complemented by lab sessions.
Workload	35 hours presence (lecture: 20 hours; lab session: 15 hours), 145 hours for preparation and assignments.
Credits	6
Assignments	Credits are allocated for 1-3 assignments completed during the semester: written assignments (e.g., mathematical or coding problem sets; research or analysis paper; technical report; data analysis exercises, data science project); oral presentation (optional); and written exam (optional).
Examination	The examination consists of different assignments assessed during the semester.
Grade	1,0 – 1,3 – 1,7 – 2,0 – 2,3 etc. (according to degree of performance), with a grade lower than 4,0 being "not sufficient" (fail).
Prerequisites	None.

Course cycle	Spring semester, mandatory in 1st year of study.
Usability	Master of Data Science for Public Policy

Programme Master of Data Science for Public Policy	Module III Tools of Data Science
Unit: Machine Learning	

Content & qualification objectives	Machine learning is a core technology of artificial intelligence and data science that enables computers to operate without being explicitly programmed. Recent advances in machine learning have given us such innovations as self-driving cars, AlphaGo, Amazon, and Netflix. This technology has also allowed us to predict armed conflict and post-electoral violence, detect fake news, develop targeted provision of care and public services, and implement early policy interventions. This course provides a hands-on introduction to machine learning. The course covers topics in supervised and unsupervised learning, including the most common learning algorithms such as regression, classification, random forests, clustering, and dimensionality reduction. Students will learn the fundamental concepts underlying machine learning algorithms, but will equally focus on the practical use of machine learning algorithms using open source frameworks. By the end of this course students will have a sound understanding of the key concepts of machine learning, the ability to analyse data using some of its main methods, and a solid foundation for more advanced or specialised study.
Course type	Lecture, complemented by lab sessions.
Workload	35 hours presence (lecture: 20 hours; lab session: 15 hours), 145 hours for preparation and assignments.
Credits	6
Assignments	Credits are allocated for 1-3 assignments to be fulfilled during the semester: written assignments (e.g., mathematical or coding problem sets; research or analysis paper; technical report; data analysis exercises, data science project); oral presentation (optional); and written exam (optional).
Examination	The examination consists of different assignments assessed during the semester.
Grade	1,0 – 1,3 – 1,7 – 2,0 – 2,3 etc. (according to degree of performance), with a grade lower than 4,0 being "not sufficient" (fail).
Prerequisites	Data Structures & Algorithms, Introduction to Data Science.
Course cycle	Spring semester, mandatory for 1st year of study.
Usability	Master of Data Science for Public Policy.

Programme Master of Data Science for Public Policy			Module IV Professional Development	
Credits	12	**Length of module**	2 semesters	**Module share of final grade**	0%
Module grade	none				
Study units	1) Skills Workshop I 2) Skills Workshop II 3) Internship				
Content & qualification objectives	The module is designed to strengthen the students' ability to thrive in a professional environment, and offers guidance for career advancement in the fields of public policy and data science. As part of the module, students will complete an internship that allows them to gain insights into how organisations use data and quantitative tools to take decisions for public policy, for private business or for the third sector. Students will also have opportunities for networking. Career advice and professional trainings will help students establish concrete post-graduation plans and achieve their full potential in the profession of their choice.				

	Upon completing this module, students will have either applied the knowledge gained in class to a work setting, or reflected upon how different curricular dimensions translate into the real-world context, be this in the public, private or third sector. By the end of the module, students will have acquired practical work experience and gained skills that prepare them for a successful future as data and policy practitioners.

Programme Master of Data Science for Public Policy	Module IV Professional Development
Unit: Skills Workshops I+II	

Content & qualification objectives	These workshops offer students the opportunity to acquire both soft and hard skills depending on their personal preference and professional goals. Soft skills workshops focus on competencies such as leadership, communication, creative problem solving, and conflict resolution. Hard skills offerings further hone technical capabilities. Both categories are vital for students' future careers in human-centred and data-driven institutions. A catalogue of skills workshops from which students can choose will be available each semester. The workshops cover a variety of topics and themes that matter for data science and public policy, such as media training, presentation skills, negotiation, Excel training, and data visualisation. Students choose two workshops which allow them to acquire desired skills beyond those developed within academic courses. The Career Services Team can provide consultation on the best selection and combination of skills workshops.
Course type	Workshop.
Workload	Workload per workshop (2 required): 15 hours presence, 15 hours preparation and wrap-up.
Credits	2 (1 per workshop)
Assignments	Attendance
Grade	"Pass" or "fail"
Prerequisites	None.
Course cycle	Fall and spring semester; mandatory in 1st year of study.
Usability	Master of Data Science for Public Policy, Master of Public Policy, Master of International Affairs.

Programme Master of Data Science for Public Policy	Module IV Professional Development
Unit: Internship	

Content & qualification objectives	Students are expected to attend 3-4 individual or collective career coaching sessions offered by Career Services during their studies. They are also expected to attend career events, in particular those lectures that present career paths in the fields of public policy and data science. Between the first and second year of study, students shall complete an internship at a public, private or third sector organisation. Students submit an internship report at the beginning of their third semester. After completing the module unit, students will have applied the knowledge gained in their programme of study to a real-world environment related to public policy and data science; they will have sharpened their individual professional perspectives; and they will have built a relevant network to facilitate job market entry.
Course type	Internship (professional experience).
Workload	300 hours.
Credits	10
Assignments	6-week full-time internship or 10-week part time internship of at least 20 hours/week. Internship report (1,000 – 2,000 words) due at the beginning of the 3rd semester (15th September).
Grade	"Pass" or "fail".
Prerequisites	None.

Course cycle	Internship, mandatory in the summer break between 1st and 2nd year of study; career events offered each semester; individual and collective coaching sessions offered on a rolling basis.
Usability	Master of Data Science for Public Policy.

Programme Master of Data Science for Public Policy			Module V Advanced Tools of Data Science	
Credits	12	Length of Module 1 semester	Module share of final grade	12%
Module grade	Average of final grades of all numerically graded units.			
Units	1. Advanced Tools Elective I 2. Advanced Tools Elective II			
Content & qualification objectives	Building upon "Foundation of Data Science" and "Tools of Data Science", this module aims to refine and deepen the students' data science competence and skill level by exploring state-of-the-art methods and processes in evidence-based decision-making. Students are expected to attend two courses from the "Advanced Tools of Data Science" catalogue that further expand the toolkit that they can employ as data and policy practitioners. After completing the module, students will have the ability to analyse, design, develop and present solutions for various applied data problems, be aware of the possibilities and pitfalls of utilising data science for decision-making, and have gained a better understanding of their professional aspirations and career paths.			

Programme Master of Data Science Public Policy	Module V Advanced Tools of Data Science
Unit: Advanced Tools Electives (2 required)	

Content & qualification objectives	Students attend two electives covering data science methodologies and frameworks that deepen their technical training and build on the methods and skillsets of the first-year courses. Students will also work through case studies from various sectors and industries to appreciate and learn the breadth and scope of the different data science solutions employed in the real-world, and they will learn to build conceptual frameworks to turn data into actionable insights. By the end of this unit students will have explored and developed a working knowledge of advanced data science methods, such as deep learning, and fostered their understanding of the connection between data science theory and practice, and of how public policy can employ both for better decision-making.
Course type	Lecture complemented by labs sessions, or seminar.
Workload	For lecture & labs, the workload per course: 35 hours presence (lecture: 20 hours; lab session: 15 hours), 145 hours for preparation and assignments. For seminars, the workload per course: 20 hours presence; 60 hours preparation; 40 hours wrap-up; 60 hours course assignments.
Credits	6 per course (2 courses required).
Assignments	Credits are allocated for 1-3 assignments to be fulfilled during the semester: written assignments (e.g., mathematical or coding problem sets; research or analysis paper; technical report; data analysis exercises, data science project); oral presentation (optional); and written exam (optional).
Examination	The examination consists of different assignments assessed during the semester.
Grade	1,0 – 1,3 – 1,7 – 2,0 – 2,3 etc. (according to degree of performance), with a grade lower than 4,0 being "not sufficient" (fail).
Prerequisites	Prerequisites depend on the requirements of individual elective courses.
Course cycle	Fall semester; 2nd year of study.
Usability	Master of Data Science for Public Policy

Programme				Module VI	
Master of Data Science for Public Policy				**Governance & Management for Data Science**	
Credits	12	Length of Module	2 semesters	Module share of final grade	12%
Module grade	Average of final grades of all numerically graded units.				
Units	1. Governance & Management Elective I 2. Governance & Management Elective II				
Content & qualification objectives	In their first year of studies, students are trained in the economic, political, and legal foundations of public policy, and they also gain knowledge of the technical foundations of data science. In the second year, students deepen their technical and professional training as data scientists, while also learning about the specific challenges of governing data and AI, and of navigating these challenges in an organisational context—be this a public, a private or third sector institution. This module provides students with an understanding of 1) the new and complex challenges of governing data and AI, including the ethics and legality of utilising data science in the sphere of public policy 2) the management, leadership, and judgement skills necessary to evaluate, address and lead on these challenges in an organisational context. This module builds on the module "Foundations of Public Policy" and expects students to critically evaluate, use and contextualise their growing technical competence in classes focused on different dimensions of governance, management, and leadership. Students will attend two electives in their second year of study and choose these electives from a catalogue of classes labelled as "Governance & Management for Data Science".				

Programme	Module VI
Master of Data Science for Public Policy	**Governance & Management for Data Science**
Unit: Governance & Management Electives (2 required)	
Content & qualification objectives	Students will take two electives from a catalogue labelled "Governance and Management for Data Science". These courses will equip students with the empirical knowledge, conceptual awareness and analytical tools to be able to grasp and assess 1) the governance of data and AI, including questions of law, ethics and politics; and 2) the management and leadership skills required to evaluate and address these challenges in an organisational context.
Course type	Seminar.
Workload	Workload per course (2 required): 20 hours presence; 80 hours preparation and wrap-up; 80 hours assignments.
Credits	6 per course (2 courses required).
Assignments	Credits are allocated for 1-3 assignments fulfilled during the semester, including: written assignments (e.g., research paper, policy memo, literature review, essay); oral contributions (e.g., participation, presentation, simulation); and written exam(s) (optional).
Examination	The examination consists of a set of different assignments assessed during the semester.
Grade	1,0 – 1,3 – 1,7 – 2,0 – 2,3 etc. (according to degree of performance), with a grade lower than 4,0 being "not sufficient" (fail).
Prerequisites	None.
Course cycle	Fall and spring semester; 2nd year of study.
Usability	Master of Data Science for Public Policy, Master of Public Policy.

Programme			Module VII	
Master of Data Science for Public Policy			Portfolio	
Credits	12	**Length of Module**	2 semesters	**Module share of final grade**	12%
Module grade	Average of final grades of all numerically graded units.				
Units	1. Portfolio Elective I 2. Portfolio Elective II				
Content & qualification objectives	In their second year of studies, MDS students deepen their training in data science and become systematically exposed to the challenges of governing and managing data driven processes and organisations. In addition, students take two portfolio electives. In these electives, students choose to either further specialise in data science; to broaden their understanding to a different field of public policy, management or (global) governance; or to expand their analytical tools. To do so, students freely choose two electives from the School's teaching portfolio. Classes are clustered in four fields: 1. Data science, digitalisation, and digital governance 2. Economics, economic policies, and tools of policy analysis 3. European and global governance 4. Public management, organisation, and leadership Portfolio electives focus on the use and transfer of knowledge. These electives • encourage students to apply prior training and analytical skills to the hitherto unfamiliar; • train students in developing new approaches to the hitherto familiar; • hone independence and adaptability to new academic and analytical debates, tools and challenges, including in (global) governance, public policy and data science; • foster constant interaction in class with cutting-edge academic discourse, pertinent policy debate, and technical skill-sets; • require great commitment to utilise and expand the foundational and / or specialised knowledge from students' different home programmes and areas of concentrations. By the end of the module, students will have built an elective portfolio that deepens and / or extends their empirical, theoretical, analytical, or policy-relevant training.				

Programme	Module VII
Master of Data Science for Public Policy	Portfolio
Unit: Portfolio Electives (2 required)	
Content & qualification objectives	Students are offered courses in the following portfolio categories: **1. Data science, digitalisation, and digital governance** electives focus on (i) data science tools; (ii) digitalisation across all sectors of modern society; (iii) governance and regulation of digitalisation. **2. Economics, economic policies, and tools of policy analysis** electives focus on (i) advanced economics, statistics, and econometrics courses that deepen the understanding and use of special model types; (ii) other tools and methods for scientific inquiry and institutional or policy analysis, including across different topical areas of policy and governance. **3. European and global governance** electives focus on (i) the European Union, including its policies and member states; (ii) global governance institutions and challenges, including in human rights; (iii) security challenges and debates, both within and between states and at the global level.

	4. Public management, organisation, and leadership electives focus on (i) specific management tools; (ii) the governance and management of national, sub-national, supranational, and international policy making institutions across sectors; (iii) organisational design, behaviour, strategy, and leadership. Depending on the course's teaching and learning focus, key interdisciplinary questions—in particular, normative foundations, sustainability, welfare—can be taught across all four portfolio fields.
Course type	Seminar.
Workload	Workload per course (2 required): 20 hours presence; 80 hours preparation and wrap-up; 80 hours assignments.
Credits	6 per course (2 courses required).
Assignments	Credits are allocated for 1-3 assignments fulfilled during the semester, including written assignments (e.g., research paper, policy memo, technical report, essay), oral contributions, and written exam(s) (optional).
Examination	The examination consists of a set of different assignments assessed during the semester.
Grade	1,0 – 1,3 – 1,7 – 2,0 – 2,3 etc. (according to degree of performance), with a grade lower than 4,0 being "not sufficient" (fail).
Prerequisites	None.
Course cycle	Fall and spring semester; 2nd year of study.
Usability	Master of Data Science for Public Policy, Master of Public Policy, Master of International Affairs.

Programme Master of Data Science for Public Policy				Module VIII Master's Thesis	
Credits	24	**Length of module**	1.5 semesters	**Module share of final grade**	16%
Module grade	Numerical grade of the written Master's thesis.				
Units	1. Master's thesis colloquium 2. Master's thesis research				
Content & qualification objectives	The Master's thesis is the capstone of the two-year programme. The module enables students to prove their capacity, depth of knowledge and skill level in data science for public policy by designing, planning and implementing a research project that contributes to developing a solution for a scientific or societal challenge. Students are expected to make full use of the variety of technical tools, methodologies and academic knowledge acquired over the course of their graduate education to deliver a thesis in the field of data science. At the end of the module, students will have proved their ability to • conduct a research project independently • critically engage with the academic and policy debate on the chosen research field • effectively design and execute methodologically rigorous research • formulate a set of policy recommendations on this basis • visualise their research findings in the Master's thesis poster • constructively engage with their peers' research in the colloquium. The module contains two units: 1) the Master's Thesis Colloquium which provides research design training, support and supervision for students during their thesis development process, and 2) Master's Thesis Research which is comprised of the written thesis and a set of materials (including, for example, the relevant computer code, programming documentation and data) for replication of the research.				

Programme	Module VIII
Master of Data Science for Public Policy	**Master's Thesis**

Unit: Master's Thesis Colloquium	
Content & qualification objectives	Students design, develop and advance their research projects under the guidance of their supervisor and as part of a peer group of advisees. Supervisors offer a Master's thesis colloquium that runs from the end of semester 3 until semester 4.
	The colloquium is designed to develop necessary research design skills, and serves as a discussion and supervision forum. Participants use the colloquium to exchange ideas, knowledge and experience regarding their thesis development. They receive feedback on design, development, progress, and the content of their projects. The structured component of the colloquium provides an introduction to research design and philosophy of science components of the scientific process. The second component consists of supervisor-led seminar sessions that focus on individual supervision and peer-led feedback.
	By the end of the thesis colloquium, students should be prepared to finalise and submit their written thesis and its required components by the set deadline.
Course type	Seminar.
Workload	10 hours presence; 50 hours assignments; 190 hours guided and independent thesis research.
Credits	8
Assignments	2-3 written assignments (e.g. thesis prospectus, methodology section, empirical section); oral presentation (optional).
Grade	"Pass" or "fail".
Prerequisites	None.
Course cycle	Start in fall semester and end in spring semester; 2nd year of study.
Usability	Master of Data Science for Public Policy.

Programme	Module VIII
Master of Data Science for Public Policy	**Master's Thesis**

Unit: Master's Thesis Research	
Content & qualification objectives	The Master's thesis is an independent research project in which students apply the theoretical and technical knowledge acquired in their studies to contribute to the solution of a scientific or societal challenge.
	In addition to their written thesis, students should submit the full working code, programming documentation and data for replication of their research, and a poster that summarises and visualises the results and implications of their thesis.
	Students are encouraged to conduct their research in collaboration with a "practice partner"— a private, public or third sector institution that operates in public policy and data science.
	By completing the module, students will have shown that they can apply their skills and competences to contribute to a scientific body of knowledge, address a practical policy-relevant and/or data science problem, and design, conduct, and present their research project in a robust, structured and effective manner.
Course type	Independent Research.
Workload	Approx. 480 hours.
Credits	16
Assignments	The credits are allocated for the • written thesis (7,000-10,000 words), • thesis poster that visualises the results of the thesis, and • full replication set containing computer code, accompanying programming documentation, and data (taking into account relevant data protection legislation).
Examination	The examination is composed of the written Master's thesis, materials for research replication and the poster. The grade for the written thesis must be 4,0 or higher on the Hertie School's grading scale, and the thesis poster must be graded "pass".

Grade	1,0 – 1,3 – 1,7 – 2,0 – 2,3 etc. (according to degree of performance), with a grade lower than 4,0 being "not sufficient" (fail). The final grade for the master's thesis is the grade for the written thesis. The grade comprises the arithmetic mean of the two grades awarded by the members of the thesis committee.
Prerequisites	None.
Course cycle	Start in fall semester and end in spring semester; 2nd year of study.
Usability	Master of Data Science for Public Policy.

Annex: Examination Requirements and Objectives

Examination Requirement	Details	Objectives
Research paper Policy analysis paper	3,000 – 7,000 words; pre-defined period of time (e.g., 1-6 weeks)	Students gain the competence to critically assess theoretical arguments, analyse and apply concepts and theories to a policy problem, design a robust research project, and formulate policy recommendations. A research (design) paper has a stronger focus on critical assessment, while a policy analysis paper has a stronger policy focus.
Policy memo	500 – 1,500 words; pre-defined period of time (e.g., 3-10 days)	Students gain the competence to brief practitioners in a ministry, international organisation or other policy relevant institution
Negotiation brief	500 – 1,500 words; pre-defined period of time (e.g., 3-10 days)	Students learn to analyse a specific negotiation topic, and to identify and assess an actor's goals, institutional competences, (historical) roles and strategies. A negotiation brief can also train the competence to brief practitioners in a ministry, international organisation or other policy relevant institution.
Editorial Blog	500 – 1,000 words; pre-defined period of time (e.g., 3-10 days)	Students learn to identify, engage with, analyse, comment on, and effectively present a current issue or debate related to their programme of study to a target audience.
Literature review	500 – 1,000 words; pre-defined period of time (e.g., 3-10 days)	Students gain the competence to extract, compare, and critically assess arguments from the literature on a certain topic.
Data analysis exercise	Quantitative data and problem set to be processed in a given time period (e.g., 5-7 days)	Students gain the competence to independently process raw quantitative data on a topic related to their field of studies, formulate and test hypotheses, and summarise the results.
Mathematical or coding problem set	Exercises with various difficulty levels based on material taught in class, which the student is expected to solve with full working solutions.	Students learn to develop strategies and intuition to explore and solve technical challenges, solidifying their understanding of the taught mathematical and programming principles.
Essay	2,000 - 3,000 words; pre-defined period of time (e.g., 1-4 weeks)	Students learn to effectively develop, introduce, substantiate, and present a line of argumentation for either an academic or a more public audience.
Written exam	90 – 120 minutes; supervised and in an assigned location	Written exams provide learning incentives with the objective that students show mastery of the overall contents covered in a course. Students gain the competence to recall knowledge, concisely present knowledge, and apply skills they learned within a pre-defined period of time.
Online exam Open book exam	45 – 120 minutes; online and without supervision	The examination tests a student's factual knowledge as well as their understanding of processes, interrelationships and applications. Students need to show their competences and skills, in addition to factual knowledge, within a pre-defined period of time.
Take-home exam	6 – 72 hours; online and without supervision	Students process an assignment in a pre-defined period of time, e.g. a case study or data analysis, and apply skills and knowledge they have learned during the course.
Oral presentation Class participation	10 – 30 minutes; individual or in group; in-class	Students acquire and display key policy-competences such as presentation, oral argumentation, negotiation, and public speaking.