Programme-specific Section of the Curriculum for the MSc Programme in Statistics at the Faculty of Science, University of Copenhagen

2010 (Rev. 2025)

Contents

1 Title, affiliation and language
A shared section that applies to all BSc, part-time MSc and MSc Programmes at the Faculty of Science is linked to this programme-specific curriculum.

1.1 Title
The MSc Programme in Statistics leads to a Master of Science (MSc) in Statistics with the Danish title: *Cand.scient. (candidatus/candidata scientiarum) i statistik*.

1.2 Affiliation
The programme is affiliated with the Study Board of Mathematics and Computer Science, and the students can both elect, and be elected, to this study board.

1.3 Corps of external examiners
The following corps of external examiners is used for the central parts of the MSc Programme:

- Corps of External Examiners for Mathematics (*matematik*).

1.4 Language
The language of this MSc Programme is English.

2 Academic profile
2.1 Purpose
The MSc programme in Statistics is a research-based programme, the objective of which is to provide the student with the knowledge of and insights into the main fields and methodologies of mathematical statistics required to work independently within this field.

2.2 General programme profile
The programme provides a general introduction to the main fields of mathematical statistics, the underlying probability theory, and the calculation techniques required to solve practical statistical problems. It is subsequently possible to specialise within one of these fields.

Statistics, Mathematics and Computer Science are the key subject areas of the programme.

2.3 General structure of the programme
The MSc Programme is set at 120 ECTS.

There are no defined specialisations in this programme.

2.4 Career opportunities
The MSc Programme in Statistics qualifies students to become professionals within business functions and/or areas such as:

- A PhD programme
- Health research.
- Statistical functions in the pharmaceutical industry.
- The financial sector.

3 Description of competence profiles
Students following the MSc Programme acquire the knowledge, skills and competences listed below. Students will also acquire other qualifications through elective subject elements and other study activities.

3.1 Competence profile

Graduates holding an MSc in Statistics have acquired the following:

Knowledge about:

- Selected research-active fields.
- Stochastic processes.
- Statistical models applicable to broad classes of data.
- Likelihood methods and likelihood-adjacent methods.
- Conditioning and Markov properties of probability distributions.
- Sufficiency, ancillarity and other factorization properties of statistical models.
- Frequentist and Bayesian principles of statistical inference.

Skills in/to:

- Read and understand mathematical and statistical original literature.
- Communicate mathematical questions and issues on a scientific basis both with fellow experts and with specialists in other fields.
- Account orally and in writing for statistical inquiries into open problems.
- Apply general asymptotic methodologies to specific probabilistic models.
- Develop probabilistic models for specific statistical applications.
- Analyse concrete data sets using standard as well as tailor-made statistical models.

Competences in/to:

- Conduct an independent statistical analysis on a measure theoretical foundation of complex experiments and observational studies and divide it into smaller easily accessible challenges.
- Investigate open statistical problems using probability theory methods.
- Develop new statistical solution models.
- Independently take responsibility for his or her own professional development and specialisation.
- Moreover, a holder of an MSc degree in Statistics can scientifically reflect on methods for analysing and resolving questions in statistics and probability theory.

4 Admission requirements

4.1 Bachelor's degrees that automatically fulfil the academic requirements

Applicants with one of the following Bachelor's degrees automatically fulfil the academic requirements for admission to the MSc Programme in Statistics:

- Mathematics with the BSc elective subject course package (*studieretning*) in mathematical modelling or statistics / mathematics (statistics) from University of Aarhus

4.2 Other Bachelor's degrees

Applicants with a Bachelor's degree, Professional Bachelor's degree or equivalent from Danish or international universities other than those listed in 4.1 are qualified for admission to the MSc Programme in Statistics if the programme includes the following:

- Subject elements in mathematical analysis, including measure theory (at least 22.5 ECTS).
- Subject elements in linear algebra (at least 7.5 ECTS).
- Subject elements in statistics on a measure theoretical basis (at least 15 ECTS).

For informational purpose - Bachelor's degrees that have previously been assessed as qualifying meeting the specified ECTS
Applicants with a Bachelor's degree in Actuarial Mathematics, Mathematics-Economics or Mathematics from University of Copenhagen are qualified for admission if the programme includes the following:

- Subject elements in statistics on a measure theoretical basis (at least 15 ECTS).

Applicants with a Bachelor's degree in Machine Learning and Data Science from University of Copenhagen are qualified for admission if the programme includes the following:

- NMAA05011U Analysis 2 (An2) 7.5 ECTS/NMAB21006U Lebesgueintegralet og målteori (LIM) 7.5 ECTS
- NMAA05015U Mål- og Integralteori (MI) 7.5 ECTS/NMAB21015U Sandsynlighedsteori (Sand) 7.5 ECTS
- NMAB18001U Matematisk Statistik (MatStat) 15 ECTS/ NMAB22005U Matematisk Statistik (MStat) 7.5 ECTS and NMAB22013U Sandsynlighedsteori 2 (Sand2) 7.5 ECTS

4.3 Other applicants
The Faculty may also admit applicants who, after an individual academic assessment, are assessed to possess educational qualifications equivalent to those required in Subclauses 4.1-3.

4.4 Language requirements
Applicants must be able to document English proficiency corresponding to one of the following:

- upper secondary school degree, bachelor's degree or master's degree in English from Australia, Canada, Ireland, New Zealand, United Kingdom or USA.
- Nordic entrance examination with an English level comparable to the Danish level B or higher
- International Baccalaureate (IB) from an international school
- European Baccalaureate (EB) from one of the approved schools
- English B or A as Single Subject Course in Denmark
- Abiturzeugnis from Germany
- IELTS test score of minimum 6.5
- TOEFL test score of minimum 83
- Cambridge Advanced English (CAE) or Cambridge English: Proficiency (CPE) passed at level C1 or C2

4.5 Supplementary subject elements
The qualifications of an applicant to the MSc programme are assessed exclusively on the basis of the qualifying Bachelor's degree. Supplementary subject elements passed between the completion of the Bachelor's programme and the admission to the MSc programme cannot be included in the overall assessment.

However, subject elements passed before the completion of the Bachelor's programme may be included in the overall assessment. This includes subject elements completed as continuing education as well as subject elements completed as part of a former higher education program. A maximum of 30 ECTS supplementary subject elements can be included in the overall assessment.

Subject elements passed before completing the Bachelor's programme which are to form part of the MSc programme to which the student has a legal right of admission (§15-courses) cannot be included in the overall assessment.

5 Prioritisation of applicants

There is no BSc programme with reserved access for this programme.

If the number of qualified applicants to the programme exceeds the number of places available, applicants will be prioritised according to the following criteria:

- Total number of ECTS within mathematics and statistics.

6 Structure of the programme

The compulsory subject elements, restricted elective subject elements and the thesis constitute the central parts of the programme (Section 30 of the Ministerial Order on Bachelor and Master's Programmes (Candidatus) at Universities).

6.1 Programme components

The programme is set at 120 ECTS and consists of the following:

- Compulsory subject elements, 30ECTS.
- Restricted elective subject elements, 30 ECTS.
- Elective subject elements, 30 ECTS.
- Thesis, 30 ECTS.

6.1.1 Compulsory subject elements

All of the following subject elements are to be covered (30 ECTS):

Course Code	Course Title	Block	ECTS
NMAK11022U	Regression (Reg)	Block 1	7.5 ECTS
NMAK20003U	Statistics A (StatA)	Block 2	7.5 ECTS
NMAK20004U	Statistics B (StatB)	Block 3	7.5 ECTS
NMAK14028U	Project in Statistics (ProjStat)	Block 4	7.5 ECTS

6.1.2 Restricted elective subject elements

30 ECTS are to be covered as subject elements from the following list:

Course Code	Course Title	Block	ECTS
NMAK15005U	Advanced Vector Spaces (AdVec)	Block 1	7.5 ECTS
NMAK18000U	An Introduction to Large Deviations	Block 1	7.5 ECTS
NMAK24007U	Brownian Motion (BM)	Block 1	7.5 ECTS
NMAK16005U	Computational Statistics	Block 1	7.5 ECTS
NMAK24011U	Financial Econometric Time Series Analysis (FinMetrics)	Block 1	7.5 ECTS
NDAK22000U	Machine Learning A (MLA)	Block 1	7.5 ECTS
NMAK24000U	Stochastic Processes in Continuous Time	Block 1	7.5 ECTS
NMAK24010U	Topics in Statistics	Block 1	7.5 ECTS
NMAK19003U	Applied Probability*	Block 1	7.5 ECTS
NDAK24003U	Advanced Topics in Deep Learning (ATDL)	Block 1	7.5 ECTS
NDAK24002U	Deep Learning (DL)	Block 2	7.5 ECTS
NMAK10008U	Functional Analysis	Block 2	7.5 ECTS
NMAA06062U	Geometry 2 (Geom2)	Block 2	7.5 ECTS
NMAK23005U	Inference for Stochastic Differential Equations*	Block 2	7.5 ECTS

Course Code	Course Title	Block	ECTS
NMAK17007U	Monte Carlo Methods in Insurance and Finance	Block 2	7.5 ECTS
NMAK22008U	Point Processes*	Block 2	7.5 ECTS
NMAK16019U	Survival Analysis	Block 2	7.5 ECTS
NMAK24009U	Topics in Probability	Block 2	7.5 ECTS
NDAK21004U	Probabilistic Machine Learning (PML)	Block 2	7.5 ECTS
NMAK10019U	Differential Operators and Function Spaces (DifFun)	Block 3	7.5 ECTS
NMAK22007U	Models for Complex Systems (ModComp)	Block 3	7.5 ECTS
NDAA09009U	Numerical Optimization (NO)	Block 3	7.5 ECTS
NMAK20002U	Semiparametric Inference	Block 3	7.5 ECTS
NMAK24008U	Targeted Learning*	Block 3	7.5 ECTS
NDAK21003U	Online and Reinforcement Learning (OReL)	Block 3	7.5 ECTS
NMAK17001U	Causality	Block 4	7.5 ECTS
NDAK22001U	Machine Learning B (MLB)	Block 4	7.5 ECTS
NMAK24012U	Mathemical Modelling in Infectious Disease Epidemiology*	Block 4	7.5 ECTS
NMAK13005U	Introduction to Extreme Value Theory (IntroExtremValue)	Block 4	7.5 ECTS
NMAK23006U	Interpretable Machine Learning	Block 4	7.5 ECTS
NDAK14007U	Applied Programming (APP)	Block 4	7.5 ECTS

*The course is not offered in the academic year 2025/26.

6.1.3 Elective subject elements

30 ECTS are to be covered as elective subject elements.

- All subject elements at MSc level may be included as elective subject elements in the MSc Programme.
- BSc subject elements corresponding to 15 ECTS may be included in the MSc Programme.
- Projects. See 6.1.4 Projects.

6.1.4 Projects

- Projects outside the course scope (PUK) may be included in the elective section of the programme with up to 15 ECTS. The regulations are described in Appendix 5 to the shared section of the curriculum.
- Projects in practice (PIP) may be included in the elective section of the programme with up to 15 ECTS. The regulations are described in Appendix 4 to the shared section of the curriculum.
- Thesis preparation projects (PREP) may be included in the elective section of the programme with up to 15 ECTS. The regulations are described in Appendix 6 to the shared section of the curriculum.

6.1.5 Thesis

The MSc Programme in Statistics includes a thesis corresponding to 30 ECTS, as described in Appendix 2 to the shared curriculum. The thesis must be written within the academic scope of the programme.

6.1.6 Academic mobility

The curriculum makes it possible to follow subject elements outside the Faculty of Science.

For students admitted in September the academic mobility in the MSc Programme in Statistics is placed in block 1+2 of the 2nd year.

Academic mobility requires that the student follows the rules and regulations regarding pre-approval and credit transfer.

In addition, the student has the possibility to arrange similar academic mobility in other parts of the programme.

7 Exemptions

In exceptional circumstances, the study board may grant exemptions from the rules in the curriculum specified solely by the Faculty of Science.

8 Commencement etc.

8.1 Validity

This subject specific section of the curriculum applies to all students enrolled on the programme – see however Appendix 2.

8.2 Transfer

Students enrolled on previous curricula may be transferred to the new one as per the applicable transfer regulations or according to an individual credit transfer by the study board.

8.3 Amendments

The curriculum may be amended once a year so that any changes come into effect at the beginning of the academic year. Amendments must be proposed by the study board and approved by the Dean.

Notification about amendments that tighten the admission requirements for the programme will be published online at http://www.science.ku.dk one year before they come into effect.

If amendments are made to this curriculum, an interim arrangement may be added if necessary to allow students to complete their MSc Programme according to the amended curriculum.

Appendix 1 The recommended academic progression

The table illustrates the recommended academic progression. The student is allowed to plan an alternative progression within the applicable rules.

Table – MSc Programme in Statistics

Period	Block 1	Block 2	Block 3	Block 4
1st year	Restricted elective	Restricted elective	Restricted elective	Restricted elective
	Regression	Statistics A	Statistics B	Project in Statistics
2nd year	Elective	Elective	Thesis	
	Elective	Elective		

Appendix 2 Interim arrangements

The Shared Section that applies to all BSc, part-time MSc and MSc Programmes at the Faculty of Science applies to all students.

The interim arrangements below only consist of parts where the current curriculum differs from the rules and regulations that were previously valid. Therefore, if information about relevant rules and regulations are missing, it can be found in the curriculum above.

1 General changes for students admitted in the academic year 2024//25

Students admitted to the MSc programme in the academic year 2024/25 must finish the programme as listed in the curriculum above with the following exceptions.

Restricted elective subject elements

30 ECTS are to be covered as subject elements from the following list:

Course Code	Course Title	Block	ECTS
NMAK15005U	Advanced Vector Spaces (AdVec)	Block 1	7.5 ECTS
NMAK18000U	An Introduction to Large Deviations	Block 1	7.5 ECTS
NMAK24007U	Brownian Motion (BM)	Block 1	7.5 ECTS
NMAK16005U	Computational Statistics	Block 1	7.5 ECTS
NMAK24011U	Financial Econometric Time Series Analysis (FinMetrics)	Block 1	7.5 ECTS
NDAK22000U	Machine Learning A (MLA)	Block 1	7.5 ECTS
NMAK24000U	Stochastic Processes in Continuous Time	Block 1	7.5 ECTS
NMAK24010U	Topics in Statistics	Block 1	7.5 ECTS
NMAK19003U	Applied Probability*	Block 1	7.5 ECTS
NDAK24003U	Advanced Topics in Deep Learning (ATDL)	Block 1	7.5 ECTS
NDAK24002U	Deep Learning (DL)	Block 2	7.5 ECTS
NMAK10008U	Functional Analysis	Block 2	7.5 ECTS
NMAA06062U	Geometry 2 (Geom2)	Block 2	7.5 ECTS
NMAK23005U	Inference for Stochastic Differential Equations*	Block 2	7.5 ECTS
NMAK17007U	Monte Carlo Methods in Insurance and Finance	Block 2	7.5 ECTS
NMAK22008U	Point Processes*	Block 2	7.5 ECTS
NMAK16019U	Survival Analysis	Block 2	7.5 ECTS
NMAK24009U	Topics in Probability	Block 2	7.5 ECTS
NDAK21004U	Probabilistic Machine Learning (PML)	Block 2	7.5 ECTS
NMAK10019U	Differential Operators and Function Spaces (DifFun)	Block 3	7.5 ECTS
NMAK22007U	Models for Complex Systems (ModComp)	Block 3	7.5 ECTS
NDAA09009U	Numerical Optimization (NO)	Block 3	7.5 ECTS
NMAK20002U	Semiparametric Inference	Block 3	7.5 ECTS
NMAK24008U	Targeted Learning*	Block 3	7.5 ECTS
NDAK21003U	Online and Reinforcement Learning (OReL)	Block 3	7.5 ECTS
NMAK17001U	Causality	Block 4	7.5 ECTS
NDAK22001U	Machine Learning B (MLB)	Block 4	7.5 ECTS
NMAK24012U	Mathemical Modelling in Infectious Disease Epidemiology*	Block 4	7.5 ECTS
NMAK13005U	Introduction to Extreme Value Theory (IntroExtremValue)	Block 4	7.5 ECTS
NMAK23006U	Interpretable Machine Learning	Block 4	7.5 ECTS

*The course is not offered in the academic year 2025/26.

1 General changes for students admitted in the academic year 2023/24

Students admitted to the MSc programme in the academic year 2023/24 must finish the programme as listed in the curriculum above with the following exceptions.

Restricted elective subject elements

30 ECTS are to be covered by subject elements from the following list:

Course Code	Course Title	Block	ECTS
NMAK15005U	Advanced Vector Spaces (AdVec)	Block 1	7.5 ECTS
NMAK18000U	An Introduction to Large Deviations	Block 1	7.5 ECTS
NMAK24007U	Brownian Motion (BM)	Block 1	7.5 ECTS
NMAK16005U	Computational Statistics	Block 1	7.5 ECTS
NMAK24011U	Financial Econometric Time Series Analysis (FinMetrics)	Block 1	7.5 ECTS
NDAK22000U	Machine Learning A (MLA)	Block 1	7.5 ECTS
NMAK24000U	Stochastic Processes in Continuous Time	Block 1	7.5 ECTS
NMAK24010U	Topics in Statistics	Block 1	7.5 ECTS
NMAK19003U	Applied Probability**	Block 1	7.5 ECTS
NDAK24003U	Advanced Topics in Deep Learning (ATDL)	Block 1	7.5 ECTS
NMAK22014U	Seminar in Statistics**	Block 1	7.5 ECTS
NDAK15014U	Advanced Topics in Machine Learning	Block 1	7.5 ECTS
NDAK24002U	Deep Learning (DL)	Block 2	7.5 ECTS
NMAK10008U	Functional Analysis	Block 2	7.5 ECTS
NMAA06062U	Geometry 2 (Geom2)	Block 2	7.5 ECTS
NMAK23005U	Inference for Stochastic Differential Equations**	Block 2	7.5 ECTS
NMAK17007U	Monte Carlo Methods in Insurance and Finance	Block 2	7.5 ECTS
NMAK22008U	Point Processes**	Block 2	7.5 ECTS
NMAK16019U	Survival Analysis	Block 2	7.5 ECTS
NMAK24009U	Topics in Probability	Block 2	7.5 ECTS
NDAK21004U	Probabilistic Machine Learning (PML)	Block 2	7.5 ECTS
NMAK10019U	Differential Operators and Function Spaces (DifFun)	Block 3	7.5 ECTS
NMAK22007U	Models for Complex Systems (ModComp)	Block 3	7.5 ECTS
NDAA09009U	Numerical Optimization (NO)	Block 3	7.5 ECTS
NMAK20002U	Semiparametric Inference	Block 3	7.5 ECTS
NMAK24008U	Targeted Learning**	Block 3	7.5 ECTS
NDAK21003U	Online and Reinforcement Learning (OReL)	Block 3	7.5 ECTS
NMAK17001U	Causality	Block 4	7.5 ECTS
NDAK22001U	Machine Learning B (MLB)	Block 4	7.5 ECTS
NMAK24012U	Mathemical Modelling in Infectious Disease Epidemiology**	Block 4	7.5 ECTS
NMAK13005U	Introduction to Extreme Value Theory (IntroExtremValue)	Block 4	7.5 ECTS
NMAK23006U	Interpretable Machine Learning	Block 4	7.5 ECTS
NMAK11003U	Advanced Probability Theory 1 (VidSand1)	Discontinued*	7.5 ECTS
NMAK11011U	Advanced Probability Theory 2 (VidSand2)	Discontinued*	7.5 ECTS
NMAK23013U	Privacy in Statistics and Machine Learning	Discontinued*	7.5 ECTS
NMAA05025U	Econometrics 2: Statistical Analysis of Econometric Time Series (StatØ2)	Discontinued*	7.5 ECTS
NDAK22002U	Advanced Deep Learning (ADL)	Discontinued*	7.5 ECTS

*See course specific changes below.

**The course is not offered in the academic year 2025/26.

2 General changes for students admitted in the academic year 2022/23

Students admitted to the MSc programme in the academic year 2022/23 must finish the programme as listed in the curriculum above with the following exceptions.

Restricted elective subject elements

30 ECTS are to be covered by subject elements from the following list:

Course Code	Course Title	Block	ECTS
NMAK15005U	Advanced Vector Spaces (AdVec)	Block 1	7.5 ECTS
NMAK18000U	An Introduction to Large Deviations	Block 1	7.5 ECTS
NMAK24007U	Brownian Motion (BM)	Block 1	7.5 ECTS
NMAK16005U	Computational Statistics	Block 1	7.5 ECTS
NMAK24011U	Financial Econometric Time Series Analysis (FinMetrics)	Block 1	7.5 ECTS
NDAK22000U	Machine Learning A (MLA)	Block 1	7.5 ECTS
NMAK24000U	Stochastic Processes in Continuous Time	Block 1	7.5 ECTS
NMAK24010U	Topics in Statistics	Block 1	7.5 ECTS
NMAK19003U	Applied Probability**	Block 1	7.5 ECTS
NDAK24003U	Advanced Topics in Deep Learning (ATDL)	Block 1	7.5 ECTS
NDAK15014U	Advanced Topics in Machine Learning	Block 1	7.5 ECTS
NDAK24002U	Deep Learning (DL)	Block 2	7.5 ECTS
NMAK10008U	Functional Analysis	Block 2	7.5 ECTS
NMAA06062U	Geometry 2 (Geom2)	Block 2	7.5 ECTS
NMAK23005U	Inference for Stochastic Differential Equations**	Block 2	7.5 ECTS
NMAK17007U	Monte Carlo Methods in Insurance and Finance	Block 2	7.5 ECTS
NMAK22008U	Point Processes**	Block 2	7.5 ECTS
NMAK16019U	Survival Analysis	Block 2	7.5 ECTS
NMAK24009U	Topics in Probability	Block 2	7.5 ECTS
NDAK21004U	Probabilistic Machine Learning (PML)	Block 2	7.5 ECTS
NMAK10019U	Differential Operators and Function Spaces (DifFun)	Block 3	7.5 ECTS
NMAK22007U	Models for Complex Systems (ModComp)	Block 3	7.5 ECTS
NDAA09009U	Numerical Optimization (NO)	Block 3	7.5 ECTS
NMAK20002U	Semiparametric Inference	Block 3	7.5 ECTS
NMAK24008U	Targeted Learning**	Block 3	7.5 ECTS
NDAK21003U	Online and Reinforcement Learning (OReL)	Block 3	7.5 ECTS
NMAK17001U	Causality	Block 4	7.5 ECTS
NDAK22001U	Machine Learning B (MLB)	Block 4	7.5 ECTS
NMAK24012U	Mathemical Modelling in Infectious Disease Epidemiology**	Block 4	7.5 ECTS
NMAK13005U	Introduction to Extreme Value Theory (IntroExtremValue)	Block 4	7.5 ECTS
NMAK23006U	Interpretable Machine Learning	Block 4	7.5 ECTS
NDAK14007U	Applied Programming (APP)	Block 4	7.5 ECTS
NMAK20001U	Mathematical Modelling in Epidemiology	Discontinued*	7.5 ECTS
NMAK21010U	Topics in Statistical Genetics	Discontinued*	7.5 ECTS
NMAK22019U	Machine Learning Methods in Non-Life Insurance	Discontinued*	7.5 ECTS
NMAK19006U	Optimization in Data Science	Discontinued*	7.5 ECTS
NMAK11003U	Advanced Probability Theory 1 (VidSand1)	Discontinued*	7.5 ECTS
NMAK11011U	Advanced Probability Theory 2 (VidSand2)	Discontinued*	7.5 ECTS
NMAK23013U	Privacy in Statistics and Machine Learning	Discontinued*	7.5 ECTS
NMAA05025U	Econometrics 2: Statistical Analysis of Econometric Time Series (StatØ2)	Discontinued*	7.5 ECTS

Course Code	Course Title	Block	ECTS
NDAK22002U	Advanced Deep Learning (ADL)	Discontinued*	7.5 ECTS

*See course specific changes below.
**The course is not offered in the academic year 2025/26.

3 General changes for students admitted in the academic year 2021/22

Students admitted to the MSc programme in the academic year 2021/22 must finish the programme as listed in the curriculum above with the following exceptions.

Restricted elective subject elements

30 ECTS are to be covered by subject elements from the following list:

Course Code	Course Title	Block	ECTS
NMAK15005U	Advanced Vector Spaces (AdVec)	Block 1	7.5 ECTS
NMAK18000U	An Introduction to Large Deviations	Block 1	7.5 ECTS
NMAK24007U	Brownian Motion (BM)	Block 1	7.5 ECTS
NMAK16005U	Computational Statistics	Block 1	7.5 ECTS
NMAK24011U	Financial Econometric Time Series Analysis (FinMetrics)	Block 1	7.5 ECTS
NDAK22000U	Machine Learning A (MLA)	Block 1	7.5 ECTS
NMAK24000U	Stochastic Processes in Continuous Time	Block 1	7.5 ECTS
NMAK24010U	Topics in Statistics	Block 1	7.5 ECTS
NMAK19003U	Applied Probability*	Block 1	7.5 ECTS
NDAK24003U	Advanced Topics in Deep Learning (ATDL)	Block 1	7.5 ECTS
NDAK15014U	Advanced Topics in Machine Learning	Block 1	7.5 ECTS
NDAK24002U	Deep Learning (DL)	Block 2	7.5 ECTS
NMAK10008U	Functional Analysis	Block 2	7.5 ECTS
NMAA06062U	Geometry 2 (Geom2)	Block 2	7.5 ECTS
NMAK23005U	Inference for Stochastic Differential Equations*	Block 2	7.5 ECTS
NMAK17007U	Monte Carlo Methods in Insurance and Finance	Block 2	7.5 ECTS
NMAK22008U	Point Processes*	Block 2	7.5 ECTS
NMAK16019U	Survival Analysis	Block 2	7.5 ECTS
NMAK24009U	Topics in Probability	Block 2	7.5 ECTS
NDAK21004U	Probabilistic Machine Learning (PML)	Block 2	7.5 ECTS
NMAK10019U	Differential Operators and Function Spaces (DifFun)	Block 3	7.5 ECTS
NMAK22007U	Models for Complex Systems (ModComp)	Block 3	7.5 ECTS
NDAA09009U	Numerical Optimization (NO)	Block 3	7.5 ECTS
NMAK20002U	Semiparametric Inference	Block 3	7.5 ECTS
NMAK24008U	Targeted Learning*	Block 3	7.5 ECTS
NDAK21003U	Online and Reinforcement Learning (OReL)	Block 3	7.5 ECTS
NMAK17001U	Causality	Block 4	7.5 ECTS
NDAK22001U	Machine Learning B (MLB)	Block 4	7.5 ECTS
NMAK24012U	Mathemical Modelling in Infectious Disease Epidemiology*	Block 4	7.5 ECTS
NMAK13005U	Introduction to Extreme Value Theory (IntroExtremValue)	Block 4	7.5 ECTS
NMAK23006U	Interpretable Machine Learning	Block 4	7.5 ECTS
NDAK14007U	Applied Programming (APP)	Block 4	7.5 ECTS
NMAK16010U	Graphical Models	Discontinued*	7.5 ECTS
NMAK16018U	Structural Equation Models	Discontinued*	7.5 ECTS
NDAK15007U	Machine Learning (ML)	Discontinued*	7.5 ECTS
NMAK21008U	Demography and Mortality	Discontinued*	7.5 ECTS
NMAK17005U	Machine Learning Methods in Non-Life Insurance	Discontinued*	7.5 ECTS

Course Code	Course Title	Block	ECTS
NMAB21009U	Models for Complex Systems	Discontinued*	7.5 ECTS
NMAK20001U	Mathematical Modelling in Epidemiology	Discontinued*	7.5 ECTS
NMAK21010U	Topics in Statistical Genetics	Discontinued*	7.5 ECTS
NMAK22019U	Machine Learning Methods in Non-Life Insurance	Discontinued*	7.5 ECTS
NMAK19006U	Optimization in Data Science	Discontinued*	7.5 ECTS
NMAK11003U	Advanced Probability Theory 1 (VidSand1)	Discontinued*	7.5 ECTS
NMAK11011U	Advanced Probability Theory 2 (VidSand2)	Discontinued*	7.5 ECTS
NMAK23013U	Privacy in Statistics and Machine Learning	Discontinued*	7.5 ECTS
NMAA05025U	Econometrics 2: Statistical Analysis of Econometric Time Series (StatØ2)	Discontinued*	7.5 ECTS
NDAK22002U	Advanced Deep Learning (ADL)	Discontinued*	7.5 ECTS

*See course specific changes below.
**The course is not offered in the academic year 2025/26.

5 Discontinued courses

Course Code	Course Title	ECTS	Interim arrangement
NDAK22002U	Advanced Deep Learning (ADL)	7.5	The course was restricted elective in the academic year 2023/24 and earlier. Offered the last time: 2023/24 The course is identical to Deep Learning (DL) (NDAK24002U), 7.5 ECTS.
NMAK11003U	Advanced Probability Theory 1 (VidSand1)	7.5	The course was restricted elective in the academic year 2023/24 and earlier. Offered the last time: 2023/24 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2024/25
NMAK11011U	Advanced Probability Theory 2 (VidSand2)	7.5	The course was restricted elective in the academic year 2023/24 and earlier. Offered the last time: 2023/24 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2024/25
NMAK21008U	Demography and Mortality	7.5	The course was restricted elective in the academic year 2021/22. Offered the last time: 2021/22. Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2022/23.
NMAA05025U	Econometrics 2: Statistical Analysis of Econometric Time Series (StatØ2)	7.5	The course was restricted elective in the academic year 2023/24 and earlier. Offered the last time: 2023/24 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2024/25
NMAK16010U	Graphical Models	7.5	The course was restricted elective in the academic year 2021/22. Offered the last time: 2020/21 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2021/22

Course Code	Course Title	ECTS	Interim arrangement
NDAK15007U	Machine Learning	7.5	The course was restricted elective in the academic year 2021/22. Offered the last time: 2021/22 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2022/23
NMAK17005U	Machine Learning Methods in Non-Life Insurance	7.5	The course was restricted elective in the academic year 2021/22. Offered for the last time: 2021/22 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2022/23.
NMAK22019U	Machine Learning Methods in Non-Life Insurance	7.5	The course was restricted elective in the academic year 2022/23 and earlier. Offered for the last time: 2022/23 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2023/24.
NMAK20001U	Mathematical Modelling in Epidemiology	7.5	The course was restricted elective in the academic year 2022/23 and earlier. Offered for the last time: 2022/23 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2023/24.
NMAB21009U	Models for Complex Systems (ModComp)	7.5	The course was restricted elective in the academic year 2021/22. Offered the last time: 2021/22 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2022/23.
NMAK19006U	Optimization in Data Science	7.5	The course was restricted elective in the academic year 2022/23 and earlier. Offered for the last time: 2022/23 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2023/24.
NMAK23013U	Privacy in Statistics and Machine Learning	7.5	The course was restricted elective in the academic year 2023/24. Offered the last time: 2023/24 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2024/25
NMAK16018U	Structural Equation Models	7.5	The course was restricted elective in the academic year 2021/22. Offered the last time: 2020/21 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2021/22.
NMAK21010U	Topics in Statistical Genetics	7.5	The course was restricted elective in the academic year 2022/23 and earlier. Offered for the last time: 2022/23 Last exam if applicable (cf. SCIENCE's Teaching and exam rules): 2023/24.

Appendix 3 Description of objectives for the thesis

After completing the thesis, the student should have:

Knowledge about:

- Scientific problems within the study programme's subject areas.
- A suitable combination of methodologies/theories based on international research for use in his/her work with the problem formulation.
- Theories/models on the basis of an organised value system and with a high degree of independence.

Skills in/to:

- Apply and critically evaluate theories/methodologies, including their applicability and limitations.
- Assess the extent to which the production and interpretation of findings/material depend on the theory/methodology chosen and the delimitation chosen.
- Discuss academic issues arising from the thesis.
- Draw conclusions in a clear and academic manner in relation to the problem formulation and, more generally, considering the topic and the subject area.
- Discuss and communicate the academic and social significance, if any, of the thesis based on ethical principles.

Competences in/to:

- Initiate and perform academic work in a research context.
- Solve complex problems and carry out development assignments in a work context.