Actuarial Counting of ECTS in Our Courses in the Bachelor's and Master's Programme Data Science for Business

1 Background

The Actuarial Society and the Core Syllabus require a certain number of ECTS credits within nine specified areas. These are listed in Table 1.

Within each area, the required topics are specified in more detail. A and B together must amount to at least 120 ECTS. It is not necessary to have separate dedicated courses for each topic.

The rules are compiled from an interpretation of the Core Syllabus prepared by the Actuarial Society's education committee. A master's thesis of at least 30 ECTS within a relevant actuarial area is also required.

Table 1: Core Syllabus areas and minimum ECTS requirements

Area	Description	Minimum
A	Mathematics	45 ECTS
B	Statistics	45 ECTS
C	Computer Science and Data Science	20 ECTS
D	Life Insurance	10 ECTS
E	Non-Life Insurance	10 ECTS
F	Financial Mathematics	10 ECTS
G	Business Economics and Accounting	10 ECTS
H	Economics	10 ECTS
I	Risk Management	10 ECTS

The programme considered in this report is BI's Bachelor's and Master's Programme in Data Science for Business. To make the later topic mapping and ECTS counting easier to follow, the programme structure is presented below. Unless otherwise stated, each taught course carries 7.5 ECTS.

Table 2 shows the bachelor's programme by year and semester. This gives a compact overview of the required coursework before the actuarial allocation is discussed in detail.

Table 2: Bachelor's Programme in Data Science for Business

Year	Autumn semester	Spring semester
Year 1	EXC3430 Fundamentals of Accounting and Finance EXC3460 Organizational Behavior and Leadership EXC3420 Economics I EBA3400 Programming, Data Extraction and Visualisation	EBA1180 Mathematics for Data Science EBA3520 AI and Data Ethics EBA2904 Statistics with Programming EBA3420 Databases
Year 2	EXC3500 Economics II EBA3501 Foundations of Data Science EBA3610 Decision Modelling Using Spreadsheet EBA3630 Data Driven Management Accounting	EXC2110 Basic Financial Management EXC3580 Marketing Management and Strategy Choose: electives, internship, or exchange
Year 3	Electives 30 ECTS / Elective 15 ECTS + Internship 15 ECTS / Exchange 30 ECTS	STR3610 Doing Sustainable Business EBA3530 Machine Learning and Forecasting EBA3640 Marketing Analytics EBA3650 Quantitative Economics

The master's programme is shown in Table 3. Together, the two tables provide a simple reference for the course codes and course names used in the subsequent counting of ECTS across the nine areas.

Table 3: Master's Programme in Data Science for Business

Year	Autumn semester	Spring semester
Year 1	TEM0050 Mathematics and Statistics for Data Science TEM0051 Machine Learning Operations TEM0641 Numerical Methods for Pythons with Applications TEM0052 Predictive Modelling with Machine Learning	TEM0053 Time Series Analysis and Sequential Data Networks TEM0058 Causal Inference TEM0644 Quantitative Risk and Asset Management TEM0054 Deep Learning and Explainable AI
Year 2	Choose: specialisation electives, internship, or exchange THESIS Master thesis	TEM0061 Data Protection and Ethics THESIS Master thesis

Some parts of the study plan are flexible. In the bachelor's programme, this applies in particular to electives, internship, and exchange. In the master's programme, this applies to the specialisation semester, as well as the thesis component. Since some specified electives are used directly in the actuarial counting, these are listed separately in Table 4.

2 Counting for Data Science for Business: Bachelor's and Master's

Here is a short summary of the counting of ECTS credits within the nine different areas.

Table 4: Specified electives used in the actuarial counting

Level	Code	Course name
Bachelor	ELE3781	Mathematics - Elective
Bachelor	ELE3917	Stochastic Processes for Finance and Economics
Bachelor	EXC3506	Research Methods and Econometrics
Bachelor	FIN3621	Options and Futures
Master	TEM0400	Business Economics
Master	TEM0420	Strategic Risk Analysis

2.1 A. Mathematics

Among the programme courses in the bachelor's degree, there are 17 ECTS in mathematics, while the electives contribute 13 ECTS. This gives a total of 30 ECTS in mathematics at the bachelor's level. Students must take the mathematics courses `ELE3781` and `ELE3917` as electives.

At the master's level, there are 15 ECTS in mathematics among the programme courses.

In total, there are 45 ECTS in mathematics across the bachelor's and master's degrees, which meets the minimum requirement in mathematics.

A detailed calculation and allocation of ECTS across courses is given in a separate section below.

2.2 B. Statistics

Among the programme courses in the bachelor's degree, there are 28.5 ECTS in statistics, while the electives contribute 9.5 ECTS. This gives a total of 38 ECTS in statistics at the bachelor's level. Students must take `EXC3506` as an elective.

At the master's level, there are 37 ECTS in statistics among the programme courses.

In total, there are 75 ECTS in statistics across the bachelor's and master's degrees, which meets the minimum requirement in statistics.

A detailed calculation and allocation of ECTS across courses is given in a separate section below.

The total requirement of 120 ECTS in mathematics and statistics is fulfilled. Note that only three courses must be taken as electives at the bachelor's level in order to achieve this requirement.

2.3 C. Computer Science and Data Science

- EBA3400 (7.5 ECTS): Programming, data extraction and visualization. Bachelor's level.
- EBA3420 (7.5 ECTS): Databases. Bachelor's level.
- TEM0051 (counted as 5 ECTS): Machine Learning Operations. The course covers machine learning operations, data pipelines, deployment, reproducibility, and advanced data-science workflows. Master's level.

In total, 20 ECTS, and the minimum requirement is fulfilled.

2.4 D. Life Insurance and E. Non-Life Insurance

TEM0641 (counted as 1 ECTS): Numerical Methods for Python with Applications. One application is allocated to insurance mathematics.

There is currently insufficient course coverage in both life insurance and non-life insurance.

2.5 F. Financial Mathematics

- TEM0644 (2 ECTS): Quant Risk and Asset Management. Optimal portfolios and risk measures. Two ECTS remaining after mathematics and statistics have been accounted for.
- EXC3430 (2.5 ECTS): Fundamentals of Accounting and Finance. Basic present value theory and investment decisions. Bachelor's level.
- EXC2110 (7.5 ECTS): Basic Financial Management. Investment theory, stocks, and bonds. Bachelor's level.
- FIN3621 (7.5 ECTS): Options and Futures. Elective, spring semester, second year of the bachelor's degree.

With TEM0644, EXC3430, and EXC2110, the minimum requirement of 10 ECTS is achieved.

2.6 G. Business Economics and Accounting

- EXC3430 (5 ECTS): Fundamentals of Accounting and Finance. Substantial accounting content. Bachelor's level.
- EBA3630 (7.5 ECTS): Data-Driven Management and Accounting. Bachelor's level.
- TEM0400 (7.5 ECTS): Business Economics. Elective, master's level.

With EXC3430 and EBA3630, the requirement of a minimum of 10 ECTS is achieved.

2.7 H. Economics

- EXC3420 (7.5 ECTS): Economics 1. Introductory microeconomics and macroeconomics. Bachelor's level.
- EXC3500 (7.5 ECTS): Economics 2. Advanced microeconomics and macroeconomics. Bachelor's level.
- EBA3650 (7.5 ECTS): Quantitative Economics. Bachelor's level.

The requirement of a minimum of 10 ECTS is fulfilled.

2.8 I. Risk Management

TEM0420 (7.5 ECTS): Strategic Risk Analysis. Elective, master's level.

There is a missing 2.5 ECTS, but this may be defended as covered within the finance, economics, and accounting courses.

2.9 Master's Thesis

The standard master's thesis is 30 ECTS, distributed across the final two semesters, so this requirement is fulfilled. The master's thesis must be actuarially relevant.

2.10 What Is Needed

There is a need for 19 ECTS in life and non-life insurance mathematics (areas D and E).

It would be possible to create one non-life course and one life course as electives at the bachelor's and master's levels, each worth 7.5 ECTS. In addition, an insurance case could be included in *Doing Sustainable Business*, worth 4 ECTS. This would cover 20 ECTS.

3 Detailed Counting of A and B Credits in Our Courses

Here is a list of course codes and the estimated amount of mathematics (A) and statistics (B) contained in each course. Note that probability theory is counted as A, mathematics.

3.1 Bachelor's Programme Courses

`EBA1180` **(7.5 ECTS A)**
Linear algebra and calculus.

`EBA3520`
A great deal related to data ethics, but this is not counted as statistics.

`EBA2904` **(7.5 ECTS B)**
Regression, hypothesis testing, estimation, and distributions.

`EBA3420` **(1 ECTS B)**
Databases, data extraction, processing, and analysis of data. Some statistics are counted here.

`EBA3501` **(7.5 ECTS B)**
Regression, regularized regression (LASSO and Ridge), p-values, and cross-validation.

`EBA3610` **(7.5 ECTS A)**
A great deal of optimization theory, linear programming, LP problems, and mixed-integer programming. A small amount of statistics is also included, among other things simulations and decision theory under uncertainty.

`EBA3630`
Data-Driven Accounting. Some data processing, but no statistics are counted here.

`EBA3530` **(7.5 ECTS B)**
Machine learning and forecasting, time series, classification, and related topics. This is modern statistics.

EBA3640 **(3 ECTS B)**

Marketing Analytics. Part of the course is data analysis using statistical software, with a focus on causality and A/B experiments, including split testing and randomized controlled trials in marketing.

EBA3650 **(2 ECTS A, 2 ECTS B)**

Quantitative Economics. This includes numerical methods, optimization, and equation solving, that is, elements of advanced numerical mathematics. It also includes a good deal of statistics, including factor models.

3.2 Bachelor's Electives

ELE3781 **(7.5 ECTS A)**

Linear algebra, complex numbers, differential and difference equations, multivariable optimization, and optimal control theory. This course corresponds to master's-level economics mathematics, but also contains more linear algebra. Note that ELE3796, Advanced Mathematical Analysis and Linear Algebra, may also be taken as an elective, but this is one step below ELE3781 and is therefore not included in this count.

EXC3506 **(7.5 ECTS B)**

Time series, multiple regression, hypothesis testing, forecasting, and model selection.

ELE3917 **(5.5 ECTS A, 2 ECTS B)**

Stochastic processes, Brownian motion, Poisson processes, and probability theory. This course is counted as mainly focused on probability theory, that is, mathematics.

Table 5: Bachelor's-level summary of mathematics and statistics allocation

Category	Mathematics (A)	Statistics (B)
Programme courses	17	28.5
Electives	13	9.5
Total	30	38

3.3 Master's Programme Courses

TEM0050 **(5 ECTS A, 2.5 ECTS B)**

Mathematics and Statistics for Data Science. Calculus, optimization theory, linear algebra, and probability theory are mathematics. The part dealing with statistical inference is statistics.

TEM0051 **(2.5 ECTS B)**

Machine Learning Operations. Some parts involve data curation, extraction, and handling of data, with a focus on model training, evaluation, and validation, which are necessarily statistics. The project also applies statistical methods and tools.

TEM0641 **(5 ECTS A, 1.5 ECTS B)**

Numerical Methods for Python with Applications. There is one insurance application part, allocated 1 ECTS elsewhere. In addition, there is a full focus on numerical methods, which is mathematics. Numerical methods for solving nonlinear equations, minimization, integration, function approximation, numerical methods for differential equations, simulation of stochastic processes and sampling, and machine learning as constrained optimization are included. There are also applications to finance, climate, and real options, all of which involve some degree of statistics.

TEM0052 **(7.5 ECTS B)**

Predictive Modelling with Machine Learning. This is in reality a statistics course, with GLM, clustering, classification, and statistical learning at master's level.

TEM0053 **(7.5 ECTS B)**

Time Series Analysis and Sequential Data Networks. There is some focus on natural language processing and machine learning, but overall this is a course in time series, prediction, and Kalman filtering.

TEM0058 **(7.5 ECTS B)**

Causal Inference. A statistics course for economic inference with large-scale, high-dimensional data.

TEM0644 **(2.5 ECTS A, 3 ECTS B)**

Quantitative Risk and Asset Management. A great deal concerns different probability distributions, risk measures, multivariate analysis, statistics, and copulas. There is also probability theory here, especially in connection with portfolio theory, which includes stochastic processes. Two ECTS are reserved for economics and finance in the Core Syllabus.

TEM0054 **(2.5 ECTS A, 5 ECTS B)**

Deep Learning and Explainable AI. This is modern statistical learning. It also includes optimization and numerical mathematics due to deep learning and explainability, including differentiation and Shapley values.

The requirements are fulfilled in both mathematics and statistics individually, as well as the total requirement of 120 ECTS in mathematics and statistics combined.

Table 6: Master's-level and combined summary of mathematics and statistics allocation

Category	Mathematics (A)	Statistics (B)
Master's programme courses	15	37
Total, bachelor's + master's	45	75

References

The Norwegian Society of Actuaries. (2025). *Competence requirements for qualified membership in the norwegian society of actuaries for applicants with equivalent knowledge*. Retrieved April 9, 2026, from https://www.aktfor.no/media/ev3p115f/dna_kompetensekrav-tilsvarendekunnskaper-oktober-2025_norsk_oppdatert_20251120.pdf