

UNIVERSITY OF GOTHENBURG  
Institute of Medicine



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**Master's Programme in Applied Biostatistics**  
120.0 Credits

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Code: M2STA

**Valid from**

HT2026 Autumn semester 2026

**Swedish name**

Masterprogram i tillämpad biostatistik

**Entry level**

2 Second cycle

Specialisations

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**Decision maker**

SA Sahlgrenska Academy

**Decision date**

2026-06-11

## Date of entry into force

2026-06-11

## Valid from semester

Autumn term 2026

## Registration number

GU 2026/1971

## Starts at first-cycle level and ends at second-cycle level

No

## Purpose

Increasingly, research and development in health, healthcare, and life sciences sectors rely to a growing degree on the collection and analysis of data from various sources. This can involve clinical trials, observational studies, or basic research on, for example, biochemical mechanisms, as well as studies of public health, including health risk factors and the effects of health interventions. An important part is also data on patient characteristics, treatments and long-term life outcomes collected in health care and in Swedish and international registers, with applications in research, quality monitoring and resource allocation decisions, among others. Data can be of many , such as biochemical measurements, questionnaire responses, scores, diagnoses, survival rates, genetic factors and molecular biological data, and vary in scope and collection methods.

For this volume of data to benefit society through development and innovations in both the public and private sectors, expertise is required to collect, manage, visualize, analyse using statistical methods, and draw conclusions based on extensive datasets.

The purpose of the program is to provide students with a broad and in-depth understanding of statistical methods, including insight into the limitations of these methods and their applicability to different types of data and research questions, as well as how results can be interpreted and generalized. Upon completion of the program, students will be familiar with all stages of a project involving statistical analysis of health-related data.

This includes the design and analysis of various types of studies in basic research, clinical research and epidemiological research, encompassing experimental, intervention and observational studies. A key component is understanding how data is collected and independently mastering all steps in data management, analysis and visualization. Furthermore, the program aims to develop good practices for planning, documenting, and reporting work, with a focus on reproducibility. The use of AI is integrated both as part of effective workflows and as a method for data analysis.

## Entry requirements

Qualification for admission to the Master's Programme in Applied Biostatistics requires:

- Bachelor's degree or equivalent professional degree of 180 credits in health sciences, economic, natural sciences, or engineering.
- At least 7.5 credits in statistics.
- English 6, Mathematics course 3b/3c. Or: English level 2, Mathematics Further level 1b/1c

## Degree and main field of study

This programme leads to a Degree of Master of Medical Science (120 credits) with a major in Applied Biostatistics (Medicine masterexamen i huvudområdet Tillämpad Biostatistik).

## Content

The program consists of a total of 120 credits, with 105 credits allocated to mandatory courses, including a 30-credit thesis, and 15 credits allocated to elective courses. The courses are designed and organized to provide progression within the framework of the program learning outcomes and to collectively offer both breadth and depth in the main field of study.

The first semester begins with an introduction to biostatistics focusing on inference and mathematical foundations, including a review of linear algebra and functions, as well as a course in R programming that covers the basics of programming, data management, analysis and visualization. This is followed by a course in study design and experimental planning, including an introduction to epidemiology, and a course in regression methods that forms the foundation for several of the advanced courses in biostatistical methods.

The second semester includes advanced courses in the main field, which together provide comprehensive and in-depth methodological knowledge in biostatistics, with an increased understanding of statistical modelling, and the application of various methods in medical research and life sciences. Example of topics are methods for handling incomplete data, more advanced regression models, and causal inference with methods for mapping causal relationships and concepts such as confounding factors, mediation, directed acyclic graphs (DAGs) and propensity score.

Additionally, statistical learning is a component of the second semester, covering principles and methods for both unsupervised and supervised learning in regression, classification and clustering, as well as general principles for evaluating predictive analysis and model performance. An important part of the second semester is also a course focusing on health data and questionnaires, which deepens the understanding of handling and analysing data structures typical for medical research and development projects. This includes knowledge and management of registry data and composite outcomes, as well as evaluation of questionnaires, health instruments and scores. The course enhances skills in R programming and supports the student's development towards a professional role as an independent, applied biostatistician capable of handling all stages of data analysis.

The third semester includes mandatory courses in survival analysis and machine learning and AI, as well as elective courses. The survival analysis course provides an in-depth study of specialized methods for handling and analysing data containing information about time-to-event. The course on machine learning and AI builds on and applies the fundamental principles of statistical learning covered in the second semester, offering a broad overview of current methods for analysis. The elective courses allow for individual specialization, where students can broaden or deepen their knowledge based on their interests, prior knowledge, and the current course offerings. They can choose from courses in areas such as health economics, clinical trials, or additional statistical methods and their applications in life sciences. The institution will offer at least 15 credits of elective courses, but students also have the option to select advanced-level courses outside the program, provided they meet the prerequisites for those courses.

In the program, students will sit in on statistical consultations given as part of the statistical advisory services provided by the Department of Medicine, which will enhance their understanding of the practice of biostatistics in scientific projects.

The sequence of the courses may be subject to change. The program is offered full-time and includes the following courses:

### Program structure

#### First semester

- Introduction to biostatistics, 9 credits
- R programming for applied biostatistics, 6 credits
- Study and experimental design, 7.5 credits

- Regression methods, 7.5 credits

#### Second semester

- Causal inference, 7.5 credits
- Health data and questionnaires, 7.5 credits
- Statistical learning, 7.5 credits
- Advanced statistical methods, 7.5 credits

#### Third semester

- Survival analysis, 7.5 credits
- Machine learning and AI, 7.5 credits
- Elective courses, 15 credits

#### Fourth semester

- Master's Thesis in Applied Biostatistics, 30 credits

## Objectives

The objectives of the program, in addition to the general learning outcomes specified for the master's degree in the Higher Education Ordinance (SFS 1993:100, System of Qualifications, Appendix 2), are the following local learning outcomes:

#### *Knowledge and understanding*

For a Degree of Master, the student shall

- demonstrate knowledge and understanding of basic as well as advanced methods and models in biostatistics, with in-depth knowledge of commonly used analysis methods and their applications.
- be able to describe different types of studies, including their areas of application and limitations, as well as the data structures and analysis methods commonly used in these study types.
- be able to explain the components of a project involving quantitative data, with a particular focus on the parts related to data management, analysis, and interpretation.

#### *Competence and skills*

For a Degree of Master, the student shall

- integrate and apply knowledge from biostatistics to scientific questions, contribute to the design of studies, make appropriate methodological choices, and analyse, assess, and manage complex issues and situations related to health data.
- independently and effectively manage data by transforming, converting, and adapting data for analysis, as well as performing the chosen analyses and visualizing data using statistical programming.
- verbally and in writing present results and conclusions based on data analysis, including a clear description, with justification, of the chosen method, and provide interpretations of results and conclusions in a suitable manner for different audiences.

#### *Judgement and approach*

For a Degree of Master, the student shall

- critically evaluate the use of a chosen statistical model for different research questions, study designs and data.
- discuss the strengths and limitations of various design and analysis strategies, considering both scientific and ethical aspects.
- reflect on methods for documenting the analysis and reporting the results, focusing on both reproducibility and clarity.

## **Sustainability labelling**

HFPROG The programme is sustainability-focused, which means that at least one of the outcomes clearly shows that the programme content meets at least one of the University of Gothenburg's confirmed sustainability criteria. The content also constitutes the programme's main focus.

## **Other regulations**

The study programme will be followed up and evaluated in accordance with the applicable Policy for the Quality Assurance and Continuous Quality Improvement of Education at the University of Gothenburg (*Policy för kvalitetssäkring och kvalitetsutveckling av utbildning vid Göteborgs universitet*).

The language of instruction in all courses is English.

The teaching is planned to be held at the campus of Sahlgrenska Academy in Gothenburg. Much of the teaching will be performed as computer exercises, workshops, and seminars. teaching will also be in the form of blended learning where some lectures are pre-recorded and are distributed as movies/presentations via University of Gothenburg's learning management system. A prerequisite to be able to follow the programme is a computer with an internet connection, web-camera, and microphone and with the possibility to install and run statistical software such as R and RStudio.

## **Guaranteed admission**

Students who have been admitted to the programme and follow the prescribed study pace according to the programme's syllabus have guaranteed admission to the mandatory courses of the programme.

Limited guaranteed admission applies to the elective courses of the programme. In both cases, the student must satisfy the entry requirements for admission to the respective courses.