BSPH BERLIN SCHOOL OF PUBLIC HEALTH

CHARITÉ

IPH | Institute of Public Health

MASTER OF SCIENCE
EPIDEMIOLOGY

PROGRAM HANDBOOK 2024/2025

ASH Berlin Alice Salomon Hochschule Berlin University of Applied Sciences

CHARITÉ UNIVERSITÄTSMEDIZIN BERLIN

TU berlin

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The MSc Epidemiology at a glance

Target group	Inspired mid-career professionals from the health and natural sciences, social sciences, IT, or mathematical fields who want to focus their methodological knowledge in the fields of epidemiology, biostatistics, medical informatics, and health data science in order to make a difference in population health.
Student body	30 students with qualified professional experience are accepted each year.
Schedule	The program starts annually in mid-October. Full-time and part-time formats are available. Full-time students complete the program in 2 semesters (12 months). Part-time students can complete the program in 4 semesters (2 years) or more.
Program structure	The program has a methods and research focus. Ten modules (courses) must be completed: five core methods modules, three advanced elective modules, a research project, and a written Master's thesis including an oral defense. A total of 60 credit points must be earned (ECTS in accordance with the European Credit Transfer System).
Language of instruction	English
Course location	Classes are taught on site at Charité Campus Mitte (CCM) and Charité Campus Virchow Klinikum (CVK) in Berlin, Germany.
Tuition	€ 10,200 (payable in installments per semester) plus student enrollment fees (about €125 per semester).
Degree	MSc - Master of Science, awarded by Charité – Universitätsmedizin Berlin
Application deadlines	**Early admissions deadline:** January 31st. **Regular admissions deadline**: May 15th Applications received after May 15th are processed in the order in which they are received (rolling admissions) and are accepted until September 30th of each year. Please note that we cannot process students with visa needs after January 31st.

The Berlin School of Public Health

The Berlin School of Public Health (BSPH) is a collaborative initiative of three universities in Berlin:

- Alice Salomon Hochschule (ASH)
- Charité – Universitätsmedizin Berlin, Institute of Public Health (IPH)
- Technische Universität Berlin (TU Berlin), Department of Health Care Management (MiG)

Each of the partner institutions contributes its experience and expertise in the field of public health to the school's success. The Board of Directors, Prof. Dr. Raimund Geene (ASH), Prof. Tobias Kurth, MD, ScD (IPH) and Prof. Dr. Reinhard Busse (MiG), together with dedicated faculty and staff, ensure academic excellence and innovation in research.

The BSPH offers a joint, state-funded Master of Science in Public Health (MScPH) degree program that provides further education to graduates from a wide array of bachelor programs, particularly, the feeder programs in Health Sciences, Management, Social Work, and Physiotherapy/Occupational Therapy offered by the three collaborating partners. The BSPH hosts postgraduate (tuition-based) Master's programs in Epidemiology, directed by the Institute of Public Health and in Applied Epidemiology, directed by the Robert Koch Institute. Doctoral degrees in the field of public health can be earned through the cooperating partners. The TU Berlin awards the title Dr. PH and the Charité awards the titles Dr. rer. medic. and PhD.

The BSPH strives to create opportunities for interconnectedness and exchange between public health practitioners at the local, regional, and global level. Innovative research in the field of public health is needed to assess the impact of and find solutions for current challenges such as climate change, emerging infectious diseases and achieving universal health coverage. Public health research must develop new models for sustainable health system funding and create healthy living environments in an increasingly ageing, urbanized world. In addition, the digitalization in health care provides new sources of health data and requires the development of new methods of analysis. The BSPH partner institutions have a wide array of research projects tackling these challenges.

BSPH Award for outstanding Master's Theses

The topics of our students' Master's theses reflect the full spectrum and diversity of public health. Since 2018, the Berlin School of Public Health has honored outstanding achievements in its Master's programs with an award. Up to three of the Master's theses submitted in each calendar year in fulfillment of a degree at the BSPH can receive the BSPH Award. The BSPH Awards are presented at the annual graduation ceremony of the Berlin School of Public Health. Nominations are made for

- Current significance
- Innovation
- Significance for Public Health practice
- Sustainability
- Methodology

The Institute of Public Health

The Institute of Public Health (IPH) at Charité – Universitätsmedizin Berlin is committed to improving population health through excellence in research and higher education. Its research focuses on renal, neurological, and cardiovascular epidemiology, health outcome research, meta-research, and causal inference. The IPH directs the Master of Science in Epidemiology and co-directs the PhD program in Health Data Sciences as well as the Berlin Epidemiological Methods Colloquium. IPH faculty and researchers provide innovative perspectives to modern epidemiology and population health.

The MSc Epidemiology

The Master of Science in Epidemiology is a postgraduate Master's program that provides students with advanced interdisciplinary training to focus their methodological knowledge and expand their skills in epidemiologic research. The program is designed for inspired mid-career professionals from the medical and natural sciences, social sciences, IT, or mathematical fields, who want to make a difference in clinical and population health. The program has a strong research and methodological focus. Its flexible structure allows students to either study full-time or to study part-time while continuing to work part-time. Extensive collaborations with public health and health policy institutions ensure that coursework reflects current developments in research and professional scientific practice. Graduates are qualified to pursue careers as researchers in clinical trials, outbreak investigation, infection control or disease monitoring in academia or with government agencies.

Program Overview

The MSc Epidemiology consists of five core methods modules, three advanced elective modules, a research project and a Master's thesis. The program offers a variety of elective courses that students can choose from to fulfill the requirements of the advanced elective modules. The Master's thesis is an independent scientific research project.

Full-time students complete the program in one year (12 months) and part-time students complete the program in two years (four semesters). The program's flexible allows students to create individual course plans if they need more time to complete the program.

Classes are taught by experienced faculty from the Charité and partnering institutions such as the Robert Koch Institute, the Max Delbrück Center, the Berlin Institute of Health, Bayer AG, and the Hasso-Plattner-Institute.

All courses have a seminar character. In addition to imparting knowledge, courses are designed to promote interaction and exchange between students so that the knowledge each student brings from their original discipline or work experience is built upon and shared throughout the program.

Overview of courses and lead faculty:

	Module Title	**Lead Instructor**	**Credits (ECTS)**
Module 1	Public Health Research • Part 1: Research Methods - Concepts • Part 2: Statistical analysis with R	PD Dr. Yanina Lenz Dr. Stefan Konigorski	5
Module 2	Epidemiology I	Madlen Schranz, MSc	5
Module 3	Biostatistics I • Lecture • Tutorial	Annette Aigner, PhD	5
Module 4	Epidemiology II	Prof. Tobias Kurth, MD, ScD	5
Module 5	Biostatistics II	Dr. Stefan Konigorski	5
Module 6/7/8	*Choose six Advanced Elective Courses or Intensive Short Courses for a total of 15 credits* *Please note: not all courses are offered every year.*		
	Applied Medical Informatics	Prof. Dr. Dr. Felix Balzer	2.5
	Cancer and Nutritional Epidemiology	Dr. Katharina Nimptsch Prof. Dr. Tobias Pischon	2.5
	Evidence Synthesis and Evidence-based Medicine	Dr. Corinna Dressler, Nadja Wülk, MSc	2.5
	Infectious Disease Epidemiology	PD Dr. Hendrik Wilking	2.5
	Introduction to Medical Informatics	Prof. Dr. Fabian Prasser	2.5
	Molecular Epidemiology	Prof. Dr. Tobias Pischon	2.5
	Population Health Monitoring	PD Dr. Hannelore Neuhauser	2.5
	Risk Assessment: Methods in Food Science	Narges Ghoreishi Dr. Irmela Sarvan	2.5
	Intensive Short Courses	See current listing	
Module 9	Research Project	Nadja Wülk, MSc	5
Module 10	Master's Thesis	Nadja Wülk, MSc	15
		Total	60

Full-time students

Full-time students have a compact schedule and complete the program's 60 credits in two semesters (12 months). The program starts in the winter semester, which runs from October 1 through March 31. There are 18 weeks of classes, beginning in mid-October and ending in March. In weeks 1-12, Core Methods Modules are held on Mondays and Tuesdays between 14:30 and 19:00; in weeks 14-18, Core Methods Modules are held on Tuesdays between 14:30 and 19:00 and Wednesdays between 9:30 and 14:00. The Elective Courses take place in weeks 1-12 on Thursdays and in weeks 7-18 on Fridays from 14:30 to 19:00. In addition, during the first semester, students identify and prepare the research project they will work on for their Master's thesis.

The second semester (summer semester) runs from April 1 through September 30, with 12 weeks of classes beginning in mid-April and ending in July. Core Methods Modules are held on Tuesdays between 14:30 and 19:00 and Wednesdays between 9:30 and 14:00; Elective Courses take place on Mondays and Thursdays. In addition, Intensive Short Courses (ISCs) are offered as one-week intensives in August and September. Full-time students complete their research and write their Master's thesis in the second semester in parallel with completing their coursework.

Full-time students must budget an average of 40 hours per week to participate in the classes and complete all preparatory and follow-up work (Student Investment Time, SIT). Depending on their individual needs, students can choose to extend the program by changing the suggested course sequence to meet the demands their personal work or life may require. For example, all required courses can be completed in the first two semesters and the Master's thesis can be written in the third semester.

Schedule full time: 40h/week SIT

<table>
<tr><th></th><th>Monday
14:30-19:00</th><th>Tuesday
14:30-19:00</th><th>Wednesday
09:30-14:00</th><th>Thursday
14:30-19:00</th><th>Friday
14:30-19:00</th></tr>
<tr><td rowspan="2">(1) Winter Semester
October - March
18 weeks of classes</td><td colspan="5">Module 9 - Master’s Project (self study)</td></tr>
<tr><td colspan="2">Module 1 / 2 / 3 (week 1-12)
Module 1 / 2 (week 14-18)</td><td></td><td>Module 6-8
(Electives 1 / 2)</td><td>Module 6-8
(Electives 3 / 4)</td></tr>
<tr><td rowspan="2">(2) Summer Semester
April - September
12 weeks of classes</td><td colspan="5">Module 10 - Master’s Thesis (self study)</td></tr>
<tr><td>Module 6-8
(Electives 5 / 6)</td><td colspan="2">Module 4 / 5</td><td>Module 6-8
(Electives 5 / 6)</td><td></td></tr>
<tr><td colspan="6">Substitute an ISC for an Elective</td></tr>
</table>

Part-time students

Part-time students complete the program's 60 credits over the course of four semesters, with an average of 15 credits per semester. The program starts in the winter semester, which runs from October 1 through March 31. There are 18 weeks of classes that start in mid-October and end in March. The summer semesters run from April 1 through September 30 with only 12 weeks of classes starting in mid-April and ending in July. In addition, Intensive Short Courses are offered each year as one-week intensives in August and September.

Part-time students complete three of the five Core Methods Modules in their first semester (winter). In weeks 1-12, Core Methods Modules are held on Mondays and Tuesdays between 14:30 and 19:00; in weeks 14-18, Core Methods Modules are held on Tuesdays between 14:30 and 19:00 and Wednesdays between 9:30 and 14:00.

In the second semester (summer), part-time students complete the remaining two core methods modules as well as taking two advanced elective courses. Core Methods Modules are held on Tuesdays between 14:30 and 19:00 and Wednesdays between 9:30 and 14:00; Elective Courses take place on Mondays and Thursdays. Students can substitute an Intensive Short Course (ISC) for any elective during the summer semester.

In the third semester (winter), classes meet on Thursdays and Fridays between 14:30 and 19:00 for 18 weeks. Students take four advanced elective courses and identify and prepare the research project they will be working on in their Master's thesis in this semester.

The fourth semester is for working on the Master's thesis and aside from the peer group presentation and the oral defense, there is no further coursework requiring attendance during this final semester.

Part-time students must budget an average of 20 hours per week to participate in the classes and complete the preparatory and follow-up work (Student Investment Time, SIT). Depending on their individual needs, students can choose to extend the program by changing the suggested course sequence to meet the demands their personal work or life may require.

Schedule part time: 20h/week SIT

<table>
<tr><th></th><th>Monday
14:30-19:00</th><th>Tuesday
14:30-19:00</th><th>Wednesday
09:30-14:00</th><th>Thursday
14:30-19:00</th><th>Friday
14:30-19:00</th></tr>
<tr><td>(1) Winter Semester
October - March
18 weeks of classes</td><td colspan="2">Module 1 / 2 / 3 (week 1-12)
Module 1 / 2 (week 14-18)</td><td></td><td>Optionally take one or more Electives</td><td>Optionally take one or more Electives</td></tr>
<tr><td>(2) Summer Semester
April - September
12 weeks of classes</td><td>Module 6-8 (Electives 1 / 2)</td><td colspan="2">Module 4 / 5</td><td>Module 6-8 (Electives 1 / 2)</td><td></td></tr>
<tr><td>(3) Winter Semester
October - March
18 weeks of classes</td><td colspan="5">Module 9 - Master’s Project (self study)
Module 6-8 (Electives 3 / 4) | Module 6-8 (Electives 5 / 6)</td></tr>
<tr><td>(4) Summer Semester
April - September
12 weeks of classes</td><td colspan="5">Module 10 - Master’s Thesis (self study)
Optionally take one or more Electives | Optionally take one or more Electives</td></tr>
<tr><td colspan="5"></td><td>Substitute an ISC for an Elective</td></tr>
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Coursework

Modules 1 to 5: Core Methods Modules

The aim of the five core methods modules is to ensure that all students have a comprehensive set of theoretical and applied skills in epidemiologic research methods. The core modules are worth 5 credits each, for a total of 25 credits. Both full-time and part-time students should complete these modules in the first and second semesters of the program. Assessment in the modules varies and is either an on-site exam or a take-home assignment.

Overview of Core Methods Modules:

	Module Title	**Contact hours (45 minutes)**	**Credits (ECTS)**
Winter	Module 1 Public Health Research • Part 1: Research Methods - Concepts • Part 2: Statistical analysis with R	12 sessions à 2.5 hours 6 sessions à 5 hours	2.5 2.5
Winter	Module 2 Epidemiology I • Lectures • Workshops	12 sessions à 2.5 hours 6 sessions à 5 hours	5
Winter	Module 3 Biostatistics I • Lecture • Tutorial	12 sessions à 2.5 hours 12 sessions à 2.5 hours	5
Summer	Module 4 Epidemiology II • Lecture • Seminar	12 sessions à 1.5 hours 12 sessions à 1.5 hours	5
Summer	Module 5 Biostatistics II	12 sessions à 5 hours	5
		Total	**25 ECTS**

Description of Core Methods Modules

Module 1: Public Health Research

This course provides students with the tools to conduct research in epidemiology.

Part 1: Research Methods - Concepts

The seminar in Part 1 of this course focuses on how to develop meaningful and clear research questions, what to watch out for when planning a research project, data sources and primary data collection as well as publishing and communicating results from epidemiologic research.

Topics Part 1: Research methods in the social sciences and public health; phases of the research process; development of research questions; conceptualization and operationalization; survey instruments and study design; sampling and field work; ethics and data protection; quantitative, qualitative and mixed methods study design.

Lead Instructor: PD Dr. Yanina Lenz, Bayer AG

Assessment: Research Proposal

General Information: Tuesdays from 17:00 to 19:00, Week 1-12
2.5 ECTS, 30 contact hours and 45 self-study hours
Winter Semester

Part 2: Research Methods - Statistical analysis with R

Sessions in Part 2 of this course introduce students to the statistical software R and its applications in managing and analyzing data.

Topics Part 2: Statistical analyses of biomedical and epidemiological datasets using the software R and graphical interface RStudio, data manipulation, documentation and report writing using R Markdown, Creating tables and plots to visualize data and results.

Lead Instructor: Dr. Stefan Konigorski, Hasso-Plattner-Institute (HPI)

Assessment: Take-home exam

General Information: Wednesdays from 9:30 to 14:00, Week 13-18
Optional Tutorial
2.5 ECTS, 30 contact hours and 45 self-study hours
Winter Semester

Module 2: Epidemiology I

This course introduces students to epidemiologic concepts and methods.

Topics: Principles of epidemiological research and epidemiologic thinking (descriptive, analytical, experimental); populations and sampling, units of observation, variables, measures of frequency, comparing and standardization; demography, burden of disease, health reporting, surveillance; Interventional studies, randomization, blinding, clustering; Observational study design, ecologic, cross-sectional, cohort designs, case-control approaches; causal inference, counterfactuals, selection and information bias, internal validity, sources of error and strategies for controlling confounding, intermediates, DAGs, measures of effect, stratification; Diagnostics and screening, prediction models; Evidence-based medicine/public Health, external validity, reporting standards, Good Epidemiologic Practice (GEP).

Lead Instructor: Madlen Schranz, MSc, Robert Koch Institute (RKI)

Assessment: Exam

General Information: Lectures: Mondays from 14:30 to 16:30, Week 1-12
Workshops: Tuesdays from 14:30 - 19:00 , Week 13-18
5 ECTS, 60 contact hours and 90 self-study hours
Winter Semester

Module 3: Biostatistics I

This course introduces students to biostatistical concepts and statistical methods in epidemiological and clinical research.

Topics: This module will enable students to present data descriptively in an appropriate way, understand the basics of statistical tests and interpret their results, select appropriate statistical methods for data analysis, calculate and interpret confidence intervals, apply analysis methods such as regression models and survival time models and interpret their results.

Lead Instructor: Annette Aigner, PhD, Institute of Biometry and Clinical Epidemiology (iBikE), Charité – Universitätsmedizin Berlin

Assessment: Exam

General Information: Lectures: Tuesdays from 14:30 to 16:30, Week 1-12
Tutorials: Mondays from 17:00 to 19:00, Week 2-13
5 ECTS, 60 contact hours and 90 self-study hours
Winter Semester

Module 4: Epidemiology II

This course builds on the knowledge gained in Epidemiology I and provides students with a thorough understanding of epidemiological research with an emphasis on causality, causal inference, sources of bias, and methods to improve the validity of epidemiologic studies.

Topics: In-depth treatment of epidemiological study types (cohort studies, case-control studies, intervention studies); error control methods (matching, misclassification, selection bias, confounding and effect measure modification); theoretical considerations and interpretations of findings; techniques of implementation and quality assurance.

Lead Instructor:	Prof. Tobias Kurth, MD, ScD, Institute of Public Health (IPH), Charité – Universitätsmedizin Berlin
Assessment:	Exam
General Information:	Lectures: Tuesdays from 14:00 to 15:30., Week 1-12 Seminars: Tuesdays from 16:00 to 17:30, Week 1-12 5 ECTS, 50 contact hours and 100 self-study hours *Summer Semester*

Module 5: Biostatistics II

This course builds on the knowledge gained in Biostatistics I and provides students with in-depth theoretical and practical knowledge of biostatistics. Students will be able to critically analyze epidemiological studies and their reports.

Topics: Statistical aspects of study design and study planning: power and sample size calculation; Statistical methods for handling missing values; Generalized linear models: practical aspects of linear models, regression models for count and ordinal data, analysis of variance; Linear mixed models for the analysis of clustered data and longitudinal data; Meta-analysis; Statistical methods for causal inference; Statistical methods for the analysis of large data sets (e.g. cluster analysis, factor analysis); Advanced data analysis with R.

Lead Instructor:	Dr. Stefan Konigorski, Hasso-Plattner-Institute (HPI)
Assessment:	Take-home exam
General Information:	Wednesdays from 9:30 to 14:00, Week 1-12 Optional tutorial 5 ECTS, 60 contact hours and 90 self-study hours *Summer Semester*

Modules 6, 7 and 8: Advanced Elective Courses

The advanced elective courses provide room for students to pursue individual interests in 15 credits worth of courses. The electives are designed to provide students with specialized methodological skills in various areas of epidemiology. Students select six courses of 2.5 ECTS each, for a total of 15 ECTS to fulfill the requirements of Modules 6, 7 and 8. **Please note that not all courses listed below are offered every year.**

Intensive Short Courses

The IPH offers a variety of Intensive Short Courses (ISCs) each year, which can be substituted for any of the advanced elective courses regularly offered in the MSc Epidemiology program. Intensive Short Courses are open to the general research community and participants include PhD candidates as well as researchers from the Charité and other institutions. The course format is usually one week full-time, with classes meeting Monday to Friday from 9:00 to 17:00. ISCs are taught by renowned guest faculty and provide an excellent opportunity for networking.

Overview of Advanced Elective Courses:

	Course Title	**Contact hours (45 minutes)**	**Credits (ECTS)**
Winter	Cancer and Nutritional Epidemiology	6 sessions à 5 hours	2.5
Winter	Infectious Disease Epidemiology	12 sessions à 2.5 hours	2.5
Winter	Molecular Epidemiology	6 sessions à 5 hours	2.5
Winter	Population Health Monitoring	12 sessions à 2.5 hours	2.5
Summer	Applied Medical Informatics	12 sessions à 2.5 hours	2.5
Summer	Evidence Synthesis and Evidence-based Medicine	12 sessions à 2.5 hours	2.5
Summer	Introduction to Medical Informatics	Intensive Short Course	2.5
Summer	Risk Assessment: Methods in Food Science	6 sessions à 5 hours	2.5
	Examples of Intensive Short Courses		
Summer	Rethinking Epidemiologic Concepts with Matthew Fox, Boston University	1 Week	2.5
Summer	Mastering R for Epidemiologic Research with Malcolm Barrett, Stanford University	Monday to Friday from 9:00 to 17:00	2.5
Summer	Causal Research and Prediction Modeling with Rolf Groenwold and Maarten van Smeden, Leiden University		2.5
	Select electives to total		**15 ECTS**

Description of Advanced Elective Courses

Applied Medical Informatics

This course enables graduates to assess and apply digital health solutions. Practical applications of digital health and human-computer interfaces in healthcare are particular emphasized. Students will learn to assess interoperability standards between medical devices and electronic health records, to use self-generated health data for medical diagnostics or treatment (connected health), and to estimate the usefulness of digital technologies such as robotic surgery, augmented reality, or telemedicine for routine clinical practice.

Topics: Introduction to clinical data science; communication standards in practice; terminologies & ontologies in practice; usability and regulations of medical devices; patient data modalities in the electronic health record; data anonymization hands-on; innovative forms of care; telemedicine; wearables hands-on; digital surgery.

Lead Instructor:	Prof. Dr. Dr. Felix Balzer, Institute of Medical Informatics, Charité – Universitätsmedizin Berlin
Assessment:	Take-home exam
General Information:	Mondays from 16:00 to 18:00, Week 1-12 2.5 ECTS, 30 contact hours and 45 self-study hours *Summer Semester*

Cancer and Nutritional Epidemiology

Chronic diseases such as cardiovascular disease (CVD) and cancer are the leading causes of death in the industrialized world. As low and middle-income countries adopt lifestyles that go hand in hand with increasing urbanization and economic progress, cancer and heart disease incidence and mortality are also on the rise here. Eating and drinking habits play a crucial role in the development, occurrence and disease progression of chronic illnesses. The aim of the module is to give insight into applied cancer and nutritional epidemiology. Cancer epidemiology has set itself the task of identifying risk factors (primary prevention) and researching options for population-wide early detection through screening (secondary prevention). Nutritional epidemiology explores the interactions between eating habits and disease development.

Topics: Concepts and methods in cancer epidemiology; models of cancer development and their importance for prevention; nutritional survey methods; biomarkers as an indicator of nutrient intake; evidence criteria for nutrition and cancer; tumor-promoting nutritional factors, nutritional factors for the risk of cardiovascular diseases.

Lead Instructor:	Dr. Katharina Nimptsch and Prof. Dr. Tobias Pischon, Max Delbrück Center for Molecular Medicine (MDC)
Assessment:	Take Home Exam
General Information:	Fridays from 14:30 to 19:00, Week 7-12 2.5 ECTS, 30 contact hours and 45 self-study hours *Winter Semester*

Evidence Synthesis and Evidence-based Medicine

The first part of the course introduces students to systematic review methodology. Students will learn to formulate answerable research questions, develop and conduct a systematic literature search, manage data, assess risk of bias, and conduct a narrative synthesis and report results. The second part of the course introduces students to evidence-based medicine (EBM) and the process of systematically synthesizing available evidence on health care interventions to improve decision-making at both the individual patient level and the health policy level.

Topics: Review types, developing study objectives (PICO etc.), protocol development, information sources and systematic search, review data management (screening and data extraction), risk of bias assessment, narrative synthesis, the process for creating, maintaining and updating treatment guidelines based on the results of EbM.

Lead Instructor:	Dr. Corinna Dressler, Medical Library, Charité – Universitätsmedizin Berlin Nadja Wülk, MSc, Institute of Public Health (IPH), Charité – Universitätsmedizin Berlin
Assessment:	Protocol of a Systematic Review or Scoping Review
General Information:	Thursdays from 17:00 to 19:00, Week 1-12 2.5 ECTS, 30 contact hours and 45 self-study hours *Summer Semester*

Infectious Disease Epidemiology

Infectious disease epidemiology deals with the cause, distribution, risk factors and control of communicable diseases. Both specialized and general epidemiological models and methods are presented. The studies covered in this course generally have a strong real-life application and form the basis for targeted public health interventions.

Topics: General principles and methods in infectious disease epidemiology; surveillance of infectious diseases; investigation of infection outbreaks; statistics in infectious disease epidemiology, modelling in infection epidemiology; epidemiological and public health aspects of coronavirus and influenza; epidemiology of HIV and AIDS, epidemiology of sexually transmitted infections other than HIV; epidemiology of Hepatitis B and C, Tuberculosis: epidemiology and control; epidemiology of immunization prevention, epidemiology of antibiotic-resistant pathogens.

Lead Instructor:	PD Dr. Hendrik Wilking, Robert Koch Institute (RKI)
Assessment:	Presentation
General Information:	Thursdays from 17:00 to 19:00, Week 1-12 2.5 ECTS, 30 contact hours and 45 self-study hours *Winter Semester*

Introduction to Medical Informatics

This course provides students with an overview of the most important areas of medical informatics and will enhance the student's abilities to assess and work with medical informatics technologies. Students will learn to work with basic types of biomedical data and to understand the most relevant data processing methods. The course content covers further topics of high practical relevance, such as information security and data protection, software development methods for the life sciences, and open science approaches in medicine. Graduates of this course should be able to assess opportunities and risks presented by data-driven approaches in healthcare and medical research.

Topics: Health Information Systems, mHealth, Research Information Systems, Research Software Engineering, Medical Data Modelling, Clinical Data Warehousing, Data Sharing, Data Anonymization in theory and practice

Lead Instructor:	Prof. Dr. Fabian Prasser, Head of Medical Informatics Group, Center of Health Data Sciences, BIH @ Charité
Assessment:	Take Home Exam
General Information:	1-week Intensive Short Course in September 2.5 ECTS, online asynchronous with live exercise *Summer Semester*

Molecular Epidemiology

The aim of the course is to provide an overview of the field of molecular epidemiology. The conceptual framework, the use of biomarkers as well as study designs specific to the field of molecular epidemiology are presented. Introduction to genetics and modern high-throughput methods such as metabolomics, transcriptomics and proteomics.

Topics: Definition and delimitation of molecular epidemiology; use and concepts of biomarkers in molecular epidemiology; precision, accuracy, validity and reliability in molecular epidemiology; special features of study design (embedded case-control studies, case cohort studies); causal inference molecular epidemiology (Mendelian Randomization); overview of high-throughput methods and their uses, high-throughput techniques (metabolomics, transcriptomics and proteomics); overview of the use of genetics in molecular epidemiology (metabolomics, transcriptomics and proteomics); biobanks and ethics; prediction of events in molecular epidemiology (disease prediction).

Lead Instructor:	Prof. Dr. Tobias Pischon, Max Delbrück Center for Molecular Medicine (MDC)
Assessment:	Take Home Exam
General Information:	Fridays from 14:30 to 19:00, Week 14-18 2.5 ECTS, 30 contact hours and 45 self-study hours *Winter Semester*

Population Health Monitoring

Regular, reliable data on the health status of a population is invaluable for public health interventions and health policy decisions. The Robert Koch Institute (RKI) is Germany's National Public Health Institute and plays a key role in generating reliable population-based data. The RKI is responsible for Germany's health monitoring and caries out numerous health surveys that provide cross-sectional and longitudinal data for all age groups and makes the analysis of developments and trends over time possible. The RKI combines the data from health surveys with various other data sources, e.g. official statistics, social insurance claims data or social science surveys to form a meaningful overall picture. The course provides insight into the work of the Robert Koch Institute at the interface between research, politics and the numerous actors in the health and social sectors. Students learn how to plan and conduct population-wide health studies and how this data is used for epidemiological analysis, health reporting, and public health.

Topics: Public health, health monitoring, health reporting; RKI health surveys; physical health; mental health; health behavior; participatory approaches; social determinants of health; information systems for health reporting (IS-GBE).

Lead Instructor:	PD Dr. Hannelore Neuhauser, Robert Koch Institute (RKI)
Assessment:	Term Paper
General Information:	Thursdays from 14:30 to 16:30, Week 1-12 2.5 ECTS, 30 contact hours and 45 self-study hours *Winter Semester*

Risk Assessment: Methods in Food Science

Description *tba*

Topics: *tba*

Lead Instructor:	Narges Ghoreishi and Dr. Irmela Sarvan, German Federal Institure for Risk Assessment (BfR)
Assessment:	*tba*
General Information:	Thursdays, times *tba* 2.5 ECTS, contact and self-study hours *tba* *Summer Semester*

Modules 9 and 10: Research Project and Master's Thesis

The Master's thesis is an independent scientific research project and makes up one third of the MSc Epidemiology degree. Module 9 is designed to provide space for finding a topic and prepare a project that is suitable for completion in the Master's thesis. Module 10 is dedicated to completing the research project and documenting the process in a written Master's thesis. Each student is supervised by two academic advisors from the program's faculty or partner research institutions. Within the context of the Master's thesis, students have the opportunity to apply the theoretical knowledge they have gained throughout the program to a practical research project. It also provides students with an opportunity to get to know potential employers. The scope of each thesis must be such that it can be completed within six months (450 hours between April 1 and September 30 or October 1 and March 31).

Modules 9 and 10 are both offered each semester. This gives students maximum flexibility and allows the program to accommodate any unforeseen scheduling conflicts or postponements.

Overview of Research Project and Master's Thesis:

	Module Title	**Contact hours (45 minutes)**	**Credits (ECTS)**
Summer or Winter	Module 9 Research Project	Introductory Workshop Optional office hours Peer review presentation	5
Summer or Winter	Module 10 Master's Thesis	Peer review presentation Oral defense	15
		Total	**20 ECTS**

Copyright

The document submitted in fulfillment of the degree requirements (Master's thesis) is not considered a publication and the research performed for the thesis can be published at any time in any scientific journal. Please be sure to always follow good scientific practice. Charité – Universitätsmedizin Berlin cannot tolerate any form of plagiarism or scientific misconduct.

Module 9 - Research Project

This module is primarily self-study and is intended to give students time to approach potential advisors and explore topics they may want to pursue for their Master's thesis. Students meet for an introductory workshop at the beginning of the semester and then work independently to identify a topic they would like to pursue and find advisors they would like to work with. Once students have identified a topic they are interested in, the course objective is to review the available literature on the topic (background), to identify possible data sources (and their availability), and to develop meaningful research questions that can be answered with the available data sources. Students are expected to creatively discuss research ideas with their advisors. We expect advisors to help students determine how best to approach their topic and to provide feedback and guidance on the research design. In particular, the need for ethics approval should be determined at this point. If possible, students should access their data source during this module to perform some preliminary data analysis.

Towards the middle of the semester, students must formally register to participate in Module 9 once they have identified a topic they wish to pursue and advisors with whom they wish to work. The self-study period is accompanied by weekly optional office hours on Wednesdays from 14:00-16:00.

Towards the end of the semester, all students formally registered in the course meet again for a peer review session. In these sessions, each student presents the research project they have developed and intend to pursue and complete in their Master's thesis. The peer review sessions take place in small groups with an instructor. Each student has 15 minutes to present their work and 15 minutes for feedback and discussion. The goal of the peer review session in Module 9 is to ensure that each research project is feasible and meets all requirements.

The assessment for Module 9 is the development of a formatted template that can be used for the Master's thesis. The template should Include: Title page | Table of Contents | List of Abbreviations | List of Tables | List of Figures | Sample text with at least one table, one figure, and one reference | List of References.

Module 9 – Research Project

Steps

Introductory Workshop

Independent Work

- Identify a thesis topic, contact potential advisors
- Optional office hours Wednesdays from 14:00-16:00

Formal Registration for Module 9 signed by your advisors

Independent Work (continued)

- Research your topic, develop research questions, define the methodological approach, develop the study design, ensure data access, develop a plan of analysis, do some preliminary descriptive data analysis
- Discuss your work with your advisors
- Prepare a presentation for peer review
- Develop a thesis proposal

Peer Review Session

- Present your work in a peer review session. Each student has 15 minutes to present and 15 minutes for feedback and discussion. The goal is to ensure that each research project is feasible and meets all requirements.

Assessment

- Submit a formatted template you that can be used for the Master's thesis.
- The template should include: Title page | Table of contents | Statutory Declaration, Declaration of own contribution, Declaration on the use of AI | List of Abbreviations | List of Tables | List of Figures | Sample text with at least two references | Sample table | Sample figure | List of references.

Lead Instructor:	Nadja Wülk, MSc, Institute of Public Health (IPH), Charité – Universitätsmedizin Berlin
Assessment:	Formatted thesis template
General Information:	Introductory Workshop and Peer review Sessions Optional office hours Wednesdays from 14:00 to 16:00 5 ECTS, 10 contact hours and 140 self-study hours *Winter Semester* (regular schedule) or *Summer Semester* (alternate option)

Module 10 - Master's Thesis

Students complete the MSc Epidemiology by writing a publishable manuscript or monograph based on their independent scientific research.

Registration

Students must formally register for admission to Module 10 by submitting the research proposal developed in Module 9 signed by the advisors. The proposal will be presented to the Board of Admissions and Examinations for review and approval. Students are formally admitted at the beginning of each semester and have six months to complete their Master's thesis (either from April 1 to September 30 or from October 1 to March 31). This includes completing the data analysis and writing a publishable manuscript or monograph.

Peer Review Sessions

About 8 weeks before the Master's thesis is to be submitted, students present their work for peer review. The format is identical to Module 9. The peer review sessions take place in small groups with an instructor. Each student has 15 minutes to present their work and 15 minutes for feedback and discussion. The goal of the peer review session in Module 10 is to provide room for troubleshooting, to ensure that the research project is on track and will be completed, and finally, to provide an opportunity for to practice for the oral defense.

We recommend that students send a first draft of the thesis to their advisors for feedback at this time - about 8 weeks before the Master's thesis is due. We expect advisors to be available for feedback and guidance on the draft while students are still in the process of writing.

Submission and oral defense

In general, a Master's thesis is 4.000 to 10.000 words in length and should include the following chapters

- Background
    - Research question(s)
- Methods
- Results
- Discussion

as well as Title Page | Table of Contents | List of Abbreviations | List of Tables | List of Figures | Abstract | Statutory Declaration, Declaration of own contribution, Declaration on the use of AI | List of Abbreviations | List of References.

Please submit the Master's Thesis to the Program Coordinator and Student Services as an electronic version by e-mail. Hard copies of the thesis need to be submitted only if the advisors require a copy for grading or if students wish to place a hard copy in our library. Student Services will formally forward the thesis on to the advisors for grading. The advisors are asked to provide a written evaluation of the work within 6 weeks. Once Student Services receives the evaluation it is forwarded to the student. Students are then asked to schedule the oral defense with their advisors. Please notify Student Services of the time, location and date of the oral defense, as Student Services must formally invite all parties. The defense may be conducted in person or via digital platforms such as MS Teams or Zoom. This is usually the final step in completing the Master of Science in Epidemiology program.

Module 10 – Master's Thesis

Steps

Formal Registration and admission by the Board of Admissions and Examinations

Independent Work (continued from Module 9)

- Complete your research and data analysis and write your thesis

Peer Review Session

- Present your work in a peer review session. The goal is to troubleshoot, ensure that you are on track to finish as planned, and to practice for your oral defense. Each student has 15 minutes to present and 15 minutes for feedback and discussion.
- Optionally provide a draft of your thesis to your advisors for feedback

Submission

- Submit an electronic version by e-mail

Oral Defense

- Present your research in 15 minutes and then discuss it with your advisors.

Lead Instructor: Nadja Wülk, MSc, Institute of Public Health (IPH), Charité – Universitätsmedizin Berlin

Assessment: Master's Thesis in form of a monograph or publishable manuscript (80%) and Oral Defense (20%)

General Information: Peer Review Session
15 ECTS, 5 contact hours and 450 self-study hours
Summer Semester (regular schedule) or
Winter Semester (alternate option)

Admission and Enrollment

Admission requirements

In order to qualify for admission to the post-graduate Master of Science in Epidemiology, applicants must have a four-year university degree and professional work experience. In addition, we require advanced English language skills as well as an aptitude for mathematics.

- University Degree
  The university degree must encompass a minimum of 240 ECTS or equivalent (four years of regular course work). Since the different academic backgrounds of our students and their respective work experience greatly shape the quality of the discussions in our seminars, we look forward to applicants from the social sciences, natural sciences and medicine.
- Professional Experience
  The program is aimed at students with professional experience (mid-career professionals). At least one year of qualified work experience is required for admission.
- Knowledge of English
  Courses are taught in English. Please provide proof of English language proficiency at B2 CEFR standard (Common European Framework of Reference for Languages), i.e. TOEFL 87-109, IELTS levels 5-6. Alternative proof of language proficiency can be a previous university or high school degree from an English language institution, professional experience abroad or a list of publications in English.
- Mathematical aptitude
  Much of epidemiology involves numbers. Students are encouraged to have an affinity, aptitude, or strong background in mathematics and statistics. Students should be willing and interested in learning statistical computing.

Application

Early admission deadline: January 31st
In order to give international applicants enough time to prepare and plan for the academic experience, we offer an early admissions process with a deadline of January 31st each year. Applications received by January 31st are processed in February and notice of admission is provided as soon as possible. **We cannot process students with visa needs after January 31st.**

Regular admissions deadline: May 15th
The regular admissions process requires applications to be received by May 15th with notice of admission provided in early June.

Rolling admissions until September 30th
Applications received after May 15th are processed in the order in which they are received

and students are admitted as long as places are available. Applications are possible until September 30th of each year.

How to apply

Please send your complete application as a single PDF attachment by e-mail to Student Services, tanja.te-gude@charite.de. The necessary documents for an application are:

- Completed application form (please see our website).
- Curriculum Vitae (CV) (in English, maximum of 2 pages)
- Statement of Motivation detailing your motivation to study Epidemiology (in English, maximum of 1 page).
- Short Research Proposal describing a research idea that you would like to pursue in your Master's thesis (in English, maximum of 2 pages) with the following sections:
    - Context or background of your project
    - A specific research question/objective
    - Potential available data sources that may be suitable for answering your research question
    - Methods you would like to use to analyze the data and answer the research questions
- Scans of all Degree Certificates/Diplomas awarding university degrees.
- Scans of all official Academic Transcripts including an explanation of the university's grading system (description of the grading scale).
- Proof of English language proficiency at minimum B2 level based on the Common European Framework of Reference for Languages (for the full list of accepted proof, please see our website).
- Scan of your passport or ID.

Please refer to the Checklist for detailed information.

Tuition and fees

Total tuition is €10,200 payable in installments at the beginning of each semester. Students receive a bill for tuition.

- Full-time students pay two installments of €5,100 each. The first installment is due at the time of enrollment and the second installment of €5,100 is due in March before beginning the second semester for a total tuition of €10,200.
- Part-time students pay four installments of €2,550 each for a total tuition of €10,200. The first installment is due at the time of enrollment. The next three installments are due at the beginning of each of the following semesters
- Should you take longer to complete the program, no further tuition fees apply.
- In addition, university enrollment fees are due for each semester enrolled and must be paid per semester (about €125).

Overview of tuition and fees:

Semester	**Tuition part-time students**	**Tuition full-time students**	**Date due**	**University enrollment fees**
Winter 1st Semester	€2,550 enrollment	€5,100 enrollment	October 15	
Summer 2nd Semester	€2,550	€5,100 final semester	April 1	**about €125**
Winter 3rd Semester	€2,550	-/-	October 1	**due for every semester enrolled**
Summer 4th Semester	€2,550final semester	-/-	April 1	
Total	**€10,200**	**€10,200**		

Contact

Academic Director

Prof. Tobias Kurth, MD, ScD
Professor of Public Health and Epidemiology
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Charité – Universitätsmedizin Berlin

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CHARITÉ

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