



DEPARTMENT OF MEDICINE, SOLNA

K2F6109, Cardiometabolic Risk and Cardiovascular Disease, 1.5 credits (hec)

Kardiometabol risk och kardiovaskulär sjukdom, 1,5 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by The Committee for Doctoral Education on 2026-02-25, and is valid from autumn semester 2026.

Responsible department

Department of Medicine, Solna, Faculty of Medicine

Prerequisite courses, or equivalent

Undergraduate study in medicine or biomedicine

Purpose & Intended learning outcomes

Purpose

The purpose of this doctoral course is to enable PhD students to obtain advanced knowledge and a critical understanding of cardiovascular and cardiometabolic diseases and their associated risk factors. The course places particular emphasis on underlying mechanisms, epidemiology, prevention strategies, and clinical relevance.

Intended learning outcomes

The participants should, after the course, be able to:

1. show a good insight on disease epidemiology and the pathophysiological mechanisms linking cardiometabolic conditions to cardiovascular disease
2. describe how to appropriately screen for and diagnose cardiometabolic conditions
3. evaluate cardiovascular risk stratification of patients cardiometabolic conditions
4. explain mechanisms behind complications related to both cardiac and extra-cardiac manifestations of cardiometabolic conditions
5. describe preventive lifestyle measures including physical activity for cardiovascular disease

6. explain and interpret results of recent, large cardiovascular outcome trials on diabetes, obesity and lipid-lowering drugs
7. describe some of the gaps in knowledge in the relation between cardiometabolic conditions and cardiovascular disease
8. describe the fundamental steps in order to design different types of clinical trials in cardiovascular disease

Course content

With a clinical orientation, the course offers a comprehensive overview of major cardiometabolic conditions including prediabetes and diabetes, dyslipidemia, hypertension, and overweight/obesity from a cardiovascular perspective. Key topics include epidemiology, pathophysiology, and current treatment approaches within a clinical framework. Special attention is given to the management of diabetes across the full spectrum of cardiovascular disease, as well as to the critical appraisal and interpretation of large cardiovascular outcome trials, including those evaluating glucose-lowering therapies.

Lectures/Seminars on the following topics:

- Epidemiology of cardiometabolic risk factors and their interplay with cardiovascular disease, including diabetes, dyslipidemia, hypertension, and obesity
 - Screening and early detection of cardiometabolic risk factors across different populations
 - Cardiovascular risk assessment in individuals with cardiometabolic disturbances
 - Mechanisms linking cardiometabolic risk to cardiovascular disease, including biomarkers, epigenetic regulation, insulin resistance, inflammation, and microvascular dysfunction
 - Multifactorial prevention and management of cardiovascular disease through lifestyle interventions and pharmacological therapies
 - Cardiovascular outcome trials targeting cardiometabolic risk factors and their effects on atherosclerotic cardiovascular disease, heart failure, and chronic kidney disease
 - Proposed mechanisms of cardioprotection associated with cardiometabolic therapies
 - Patient-centered approaches to prevention, risk reduction, and management of cardiometabolic and cardiovascular complications
- Principles of clinical trial design in cardiovascular disease

Forms of teaching and learning

Lectures/Seminars with international lecturers and guideline experts

Debates about clinical issues

Clinical case presentations and discussion with interactive polls

Group work, focused on the analysis and interpretation of a cardiovascular outcome trial

Presentation and discussion of assigned group work

Language of instruction

The course is given in English

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components

The course participants should attend no less than 75% of the scheduled contents of the course. The participants must be actively involved in the preparation of group work and attend the sections of their respective group work and presentation/discussion. Absence from these sections cannot be compensated for.

Forms of assessment

In collaboration with other course participants, to prepare and present a written synopsis of a study protocol on topics given by the faculty members. Multiple choice questions and quizzes will be integrated in the different sessions of the course. To pass the course the course participant must be able to show that all intended learning outcomes of the course are achieved.

Course literature

Recommended reading:

Marx et al. 2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes: Developed by the task force on the management of cardiovascular disease in patients with diabetes of the European Society of Cardiology (ESC), European Heart Journal, Volume 44, Issue 39, 14 October 2023, Pages 4043–4140, <https://doi.org/10.1093/eurheartj/ehad192>

Mach et al. 2025 Focused Update of the 2019 ESC/EAS Guidelines for the management of dyslipidaemias: Developed by the task force for the management of dyslipidaemias of the European Society of Cardiology (ESC) and the European Atherosclerosis Society (EAS) European Heart Journal, Volume 46, Issue 42, 7 November 2025, Pages 4359–4378, <https://doi.org/10.1093/eurheartj/ehaf190>

McEvoy J.W et al. 2024 ESC Guidelines for the management of elevated blood pressure and hypertension: Developed by the task force on the management of elevated blood pressure and hypertension of the European Society of Cardiology (ESC) and endorsed by the European Society of Endocrinology (ESE) and the European Stroke Organisation (ESO) European Heart Journal, Volume 45, Issue 38, 7 October 2024, Pages 3912 - 4018, <https://doi.org/10.1093/eurheartj/ehae178> The organizers will provide course participants with electronic handouts/teaching materials from all lectures.

Other information

Replacing syllabus K2F5310.