



DEPARTMENT OF MEDICINE, SOLNA

K2F3120 Flow Cytometry: from Theory to Application, 1.5 credits (hec)

Flödescytometri: från teori till praktik, 1,5 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus is approved by the The Committee for Doctoral Education on 2023-11-27, and is valid from Spring semester 2024.

Responsible department

Department of Medicine, Solna, Faculty of Medicine

Prerequisite courses, or equivalent

No prerequisite courses, or equivalent, demanded for this course.

Purpose & Intended learning outcomes

Purpose

The course aims to provide doctoral students with: 1) a systematic introduction of flow cytometry, 2) an overview of flow cytometric applications in biomedical research, and 3) a hands-on opportunity of flow cytometry lab training designed for various levels of flow cytometer users.

Intended learning outcomes

Through this one-week course, the participants will acquire the knowledge of flow cytometry principles. They will know flow cytometric sample preparation and analysis, protocol set-up, major flow cytometric applications, as well as data interpretation and presentation.

Course content

The course covers basic knowledge and main applications of flow cytometry, and contains both lectures and laboratory/group work. Experts in different fields of flow cytometric application

are invited to give the lectures.

The participants will be able to learn:

- a) Principles of flow cytometry: working mechanisms of flow cytometer; molecular and cellular probes for flow cytometry; quality control; and safety procedures and instrument maintenance.
- b) Basic skills: flow cytometric protocol design; sample handling and storage; data processing and analysis, and data presentation.
- c) Major applications of flow cytometry in biomedical research: leukocyte phenotyping, endothelial cell analysis, stem cell analysis, apoptosis, platelet measurement, cell function analysis (including membrane potential, oxidative metabolism, intracellular calcium mobilization, pH, and intracellular organelles), as well as nucleic acid analysis.

Forms of teaching and learning

The course includes 28 hr lectures and 12 hr hands-on lab work.

Language of instruction

The course is given in English.

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components

The participants must attend hands-on lab sections during two afternoons. The students who have missed these sections can book extra lab section time within 4 weeks to compensate the absence.

Forms of assessment

The exam consists of two parts: a 30 min written test on flow cytometric principles; and a 60 min hands-on lab work examining flow cytometric lab skills.

Course literature

The course provides organized handouts from all lectures.