

BIOENG-514

Lab methods : flow cytometry

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Cursus	Sem.	Type
Bioengineering	MA1, MA3	Opt.
Sciences du vivant	MA1, MA3	Opt.

Language of teaching	English
Credits	2
Withdrawal Session	Unauthorized Winter
Semester	Fall
Exam	During the semester
Workload	60h
Weeks	14
Hours	2 weekly
Project	2 weekly
Number of positions	12

Il n'est pas autorisé de se retirer de cette matière après le délai d'inscription.

Remark

Inscriptions sur dossier auprès du responsable du cours; présence aux cours obligatoire

Summary

This module covers the fundamentals of Flow Cytometry, both practical and theoretical. Students will work in small groups, acquiring samples and preparing cell sorting experiments, giving them hands-on time and allowing them to put the theory into practice inside a laboratory environment.

Content

This module will cover a wide range of topics on Flow Cytometry and Cell Sorting. These lectures will start from the basics and move into the complicated aspects of flow cytometry for analysis and cell sorting. This module will be divided into three theoretical lectures, one hands-on session, a "practical part" and articles discussion.

The followings topics will be introduced :

First principles of flow cytometry

- Principle of fluorescence
- Cytometer subsystems (optics, fluidics, electronics)
- Principle of compensation
- Digital world
- Applications

Principles of Multicolour flow cytometry

- Why Multicolour ?
- Fluorescence and Fluorochromes
- How to choose the Fluorochromes
- Stain Index
- Visual Paradox
- Controls
- Applications

Principles on cell sorting

- Why and How ?
- Technological principle
- Basic parts of a cell sorter
- Limit from the technique
- Optimization
- Applications

Keywords

Flow Cytometry, fluorescence, multicolour, panel design, compensation, cell sorting

Learning Prerequisites**Required courses**

First year of master in Life Sciences & Technology or Bioengineering program.

Learning Outcomes

By the end of the course, the student must be able to:

- Integrate the basic theoretical and technical concepts of Flow Cytometry
- Apply these concepts to the analysis of biological samples and to the Flow Cytometry field
- Design a multicolor panel of different fluorescences with a minimum of compensations impact
- Analyze and interpret data coming from Flow Cytometry or sorting experiments
- Perform sample preparation for Flow Cytometry and/or sorting experiments
- Describe and explain the different methods and tools presented during the module
- Select appropriately method for sample preparation adapted to the nature of the sample sorted
- Synthesize useful information from a paper and summarize its content

Transversal skills

- Collect data.
- Summarize an article or a technical report.

Teaching methods

Ex-cathedra lectures to introduce the theory followed by demonstration and "hands-on" on practical sessions in the Laboratory including sample acquisition, analysis and data interpretation. Discussion on selected papers representative of the technique used in Flow Cytometry.

Registration forms must be sent together with a cover letter clearly stating your interest in this technique. Enrolment will be validated by the teacher on a motivational basis.

This course will take place Fall semester 2017-2018.

Assessment methods

Written exam (2 hours)

Supervision

Office hours	Yes
Assistants	Yes
Forum	No

Others Office Hours : 9:00 - 17:00
 Assistants : André Mozes & Christoph Scwärzler

Resources

Websites

- <http://fccf.epfl.ch/>
- http://twitter.com/Cytometry_EPFL

Moodle Link

- <http://moodle.epfl.ch/enrol/index.php?id=13371>