CH-728

Mass spectrometry, principles and applications

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Cursus	Sem.	Type
Chemistry and Chemical Engineering		Obl.

Language of teaching	English
Credits	3
Session	
Exam	Oral
Workload	90h
Hours	**58**
Lecture	23
Exercises	8
Practical work	27
Number of positions	**10**

Frequency

Every year

Remark

Next time: 10, 11, 12, 13 and 14 September 2018 : 09:00-12:00 BCH5310, 13:30-17:00 BCH1526.

Summary

The goal is to provide students with a complete overview of the principles and key applications of modern mass spectrometry and meet the current practical demand of EPFL researchers to improve structural analsis of molecules. Numerous instrumental aspects of mass spectrometry are described.

Content

The course program includes:

Week 1

1. **Lectures**

1.1 General introduction to MS: Definitions/Instrumentation
1.2 MS/MS:fragmentation methods and mechanisms; Ion Mobility MS
1.3 LC-MS and other hyphenated techniques
1.4 ICP-MS
1.5 Summary of all concepts and fundamental MS aspects seen during the week.

2. **Exercises:**

Ms.cheminfo org tools for advanced MS

3. **Pratical work:**

3.1 Fragmentation of small molecules (sugars, small peptides) using QTOF and FT-Orbitrap-MS, fragmentation by EI; interpretation of mass spectra using different tools and softwares.
3.2 Individual work for each doctorant topics.

Week 2

1. **Lectures**

1.1 High Resolution Mass spectrometry
1.2 Photo-dissociation spectroscopy mass spectrometry
1.3 Peptidomics/Proteomics: top-down and bottom-up approaches
1.4 MALDI-TOF: principles and applications
1.5 Ion Mobility MS

2. **Exercises**

Exercices on all topics covered by the MS course

3. **Final exam**
15'presentation of each PhD student of its individual Practical Work

The course includes practical work in mass spectrometry that will be given in the Mass Spectrometry Service Facility of ISIC (SSMI, SB, EPFL).

Note

1 week early March and 2nd week early September 2018 (block)

Keywords

mass spectrometry, tandem mass spectrometry, High-resolution mass spectrometry (HRMS), liquid chromatography, Gas chromatography, quantification, proteomics, lipidomics, metabolomics, proteomics

Assessment methods

Oral