



Advanced Analytical Tools: Multiple Applications for Mass Spectrometry

In PhD Advanced Course

June 29 – July 3, 2020

Online Course

Who should attend?

This course is intended for 1st year PhD students from FFUL. However, considering the increasing interest in mass spectrometry it is also offered to postgraduate students from FFUL or other academic institutions and industry participants.

The course will be delivered completely online through Zoom platform.

Short Introduction

Mass Spectrometry (MS) is an advanced analytical technique that has reached an outstanding position due to its unique characteristics: high selectivity, low detection limits, speed and a large diversity of applications. During the last two decades, MS has progressed rapidly through the advances on ionization methods and mass analyzers that have led to the advent of new equipment. This progress has allowed the development of new applications mostly oriented towards health promoting areas such as proteomics, lipidomics, metabolomics, foodomics, drug discovery, pollution control and forensic and toxicological sciences. This course aims to give an overview on basic MS fundamentals and instrumentation highlighting several recent applications.

It will be covered by a variety of lecturers with different experience and know-how, most of them members of the Portuguese Mass Spectrometry Network (RNEM).

Goals and Learning Outcomes

This course will provide an up-to date review of concepts and technology, as well as the qualitative and quantitative applications of MS.

The main goals are:

- ✓ To understand the fundamentals of Mass Spectrometry;
- ✓ To provide an overview of MS applications in pharmaceutical, food, chemistry, biotechnology and other areas including forensic and toxicological applications;
- ✓ To present major methods advantages and limitations and give an overview of commercially available equipment and their different applications.

Course Coordinators:

Maria Rosário Bronze (mrbronze@ff.ulisboa.pt)

Noélia Duarte (mduarte@ff.ulisboa.pt)

Teaching staff:

Ana Guerreiro (UniMS - ITQB/iBET)

Antonio Castanera (INMLCF)

Bruno Manadas (CNBC-UCoimbra)

Carlos Cordeiro (FCULisboa)

Cristina Barrocas Dias (UÉvora)

Debora Penque (INSA)

Hugo Osório (IPATIMUP)

Joaquim Marçalo (IST-ULisboa)

Maria Conceição Oliveira (IST-ULisboa)

Maria Rosário Bronze (FFULisboa)

Maria Rosário Domingues (UAveiro)

Noélia Duarte (FFULisboa)

Paulo Madeira (ASCENZA)

Ricardo Gomes (UniMS - ITQB/iBET)

Sílvia Rocha (UAveiro)

Sofia Catarino (ISA-ULisboa)

Susana Simões (INMLCF)

Vitória Rodrigues (SYNLAB)

PROGRAMME

June 29, 2020 (Monday)

Introduction.

Applications: Proteomics

09:30h – Maria Rosário Bronze/Noélia Duarte (FFULisboa): “Fundamentals on mass spectrometry and instrumentation”.

10:30h – Discussion

10:40h – Coffee break

11:00h – Debora Penque (INSA): "Mass spectrometry-based proteomics in disease biomarker discovery"

12:00h – Discussion

12:10h – Lunch Break

14:00h – Ricardo Gomes (UniMS - ITQB/iBET): “The analytical power of the QTOF-LC-MS platform to assess biologics quality attributes”

15:00h – Discussion

15:10h – Hugo Osório (IPATIMUP): "Mass-spectrometry based proteomics in cancer"

16:10h – Discussion

June 30, 2020 (Tuesday)

Applications: Metabolomics and Lipidomics

09:30h – Ana Guerreiro (UniMS - ITQB/iBET): “Tackling the complexity of metabolomics using MS platforms”

10:30h – Discussion

10:40h – Coffee break

11:00h – Maria Rosário Domingues (UAveiro): “Lipidomics in health and disease”

12:00h – Discussion

12:10h – Lunch Break

14:00h – Carlos Cordeiro (FCULisboa): “Fourier transform mass spectrometry in metabolomics, proteomics and structural biology”

15:00h – Discussion

15:10h – Silvia Rocha (UAveiro): “Body fluids metabolomics as a powerful strategy for disease biomarker discovery using advanced gas chromatography combined with mass spectrometry (GC×GC-ToFMS)”

16:10h – Discussion

July 1, 2020 (Wednesday)

Other applications of mass spectrometry

09:30h – Maria Conceição Oliveira (IST-Ulisboa): “Accurate mass screening and identification of emerging contaminants in environmental samples”

10:30h – Discussion

10:40h – Coffee break

11:00h – Joaquim Marçalo (IST-Ulisboa): “The mass spectrometer as a laboratory for fundamental chemistry studies”

12:00h – Discussion

12:10h – Lunch Break

14:00h – Bruno Manadas (CNCB-UCoimbra): “Quantitative mass spectrometry in translational research”
15:00h – Discussion
15:10h – Sofia Catarino (ISA-ULisboa): Q-ICP-MS applications for traceability and authenticity assessment.
16:10h – Discussion

July 2, 2020 (Thursday)

Other applications of mass spectrometry

09:30h – Susana Simões/Antonio Castanera (IMLCF): “Analytical requirements for quality control in forensic sciences”
10:30h – Discussion
10:40h – Coffee break
11:00h – Vitoria Rodrigues (SYNLAB): “Novel methodologies in the identification of microorganisms”
12:00h – Discussion
12:10h – Lunch Break
14:00h – Paulo Madeira (ASCENZA): “Mass Spectrometry in the crop protection industry”
15:00h – Discussion
15:10h – Cristina Barrocas Dias (UÉvora): “Mass spectrometry in cultural heritage studies”
16:10h – Discussion

July 3, 2020 (Friday)

Assessment

09:30h – Assessment
12:30h – End of Course

Assessment

A problem/question will be distributed to each student. In the last day all students will make a 5 min presentation suggesting the best solution to the problem/question. A brief discussion will follow the presentation.

Registration and Fees

This course is free for 1st year PhD students of FFUL Doctoral Program.

Enrollment is performed [via online form](#).

Tuition + assessment fee: 125€

Tuition fee: 100€

This course is limited to 25 registrations.

Certificate

Certificates of attendance will be provide to participants at the end of the course.

Contacts:

For information regarding the organization of the Course: posgraduados@ff.ulisboa.pt

For scientific information: mduarte@ff.ulisboa.pt or mrbronze@ff.ulisboa.pt