

**COURSE RECORD**

Code	<b>BENG620</b>
Name	<b>Mass Spectrometry</b>
Hour per week	3 +0 (Theory + Practice)
Credit	3
ECTS	7,5
Level/Year	Graduate
Semester	Fall
Type	Elective
Location	
Prerequisites	
Special Conditions	
Coordinator(s)	
Webpage	
Content	Basic concepts and principles of mass spectrometry. Ion sources and ionization (ESI, APCI, FAB, MALDI and others), analyzers (Magnetic-Sector, Quadrupole, Time-of-Flight, Ion-trap, FT-ICR), and detectors. Interpretation of mass spectral data. Examples of mass spectrometry methodologies in different biological applications.
Objectives	-Learn basic principles of mass spectrometry -Evaluate pros and cons of variety of MS instruments -Overview applications of mass spectrometry in biological sciences -Learn analysis mass spectrometry data
Learning Outcomes	L01 Students completing this course will be able to learn principles of mass spectrometry instruments. L02 Students completing this course will be able to interpret of mass spectral data L03 During this class students will be able to participate in group discussions
Requirements	You need to read assigned research articles before class and participate in-group discussion. You will need to search a relevant publication to present in the class.
Reading List	Mass Spectrometry for the Novice, John Greaves and John Roboz, CRC Press 2013. Mass Spectrometry: A Textbook, Jürgen H Gross, Springer 2011.
Ethical Rules and Course Policy	

**LEARNING ACTIVITIES** *Please, use this one as a reference for your course*

Activities	Number	Weight (%)
Lecture	26	40%
Group Works	13	25%
Presentations	1	25%
Site Visits	1	10%
	Total	100

**ASSESSMENT**

Evaluation Criteria	Weight (%)
Quizzes	0 %
Weekly Assignments	10%
Group Project Assignments & Presentations	20%
Attendance/Participation	10%

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Midterm	20%
Final Exam/Submission	40%
Total	100%

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For a detailed description of grading policy and scale, please refer to the website <https://goo.gl/HbPM2y> section 28.

**COURSE LOAD** *Please, use this one as a reference for your course*

Activity	Duration (hour)	Quantity	Work Load (hour)
In class activities	3	14	42
Lab/site visit	5	1	5
Group work	1	13	13
Research (web, library)	5	13	65
Required Readings	8	13	104
Pre-work for Presentation	10	3	30
Lab reports	0	0	0
<b>General Sum</b>			<b>259</b>

**ECTS: 7,5** (Work Load/25-30)

**CONTRIBUTION TO PROGRAMME OUTCOMES\***

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
L01	4	5	3	2	1	0	0	0						
L02	5	5	5	2	1	0	0	0						
L04	1	1	1	5	5	5	5	5						

\* Contribution Level: 0: None, 1: Very Low, 2: Low, 3: Medium, 4: High, 5: Very High

**WEEKLY SCHEDULE**

W	Topic	Outcomes
1	Introduction: basic concepts of mass spectrometry Activity: Group discussion	L01
2	Principles of Ionization Activity: Group discussion	L01, L02, L03
3	Introduction of different types of mass spectrometers; Anatomy of mass spectrometers Activity: Group discussion	L01, L02, L03
4	Ion source and ionization (APCI, FAB, and others) Activity: Group discussion	L01, L02, L03
5	Matrix-Assisted Laser Desorption/Electrospray Ionization Activity: Group discussion	L01, L02, L03
6	Analyzers (Magnetic-Sector, Quadrupole, Time-of-Flight) Activity: Group discussion	L01, L02, L03
7	Analyzers (Ion-trap, FT-ICR) Activity: Group discussion	L01, L02, L03
8	Measures of instrument performance Activity: Data analysis	L01, L02, L03
9	Tandem Mass Spectrometry Activity: Group discussion	L01, L02, L03
10	Interpretation of mass spectra Activity: Data Analysis	L01, L02, L03
11	Interpretation of mass spectra Activity: Data Analysis	L01, L02, L03
12	Applications of mass spectrometry I Activity: Group discussion	L01, L02, L03
13	Applications of mass spectrometry II Activity: Group discussion	L01, L02, L03
14	Student Presentations	L02, L03

Prepared by  
Date