AGU Graduate School of Engineering and Science





COURSE RECORD

COURSE RECORD	
Code	BENG620
Name	Mass Spectrometry
Hour per week	3 +0 (Theory + Practice)
Credit	3
ECTS	10
Level/Year	Graduate
Semester	Fall
Туре	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	LO1 Students completing this course will be able to learn principles of mass spectrometry instruments. LO2 Students completing this course will be able to interpret of mass spectral data LO3 During this class students will be able to participate in group discussions
Requirements	You need to read assigned research articles before class and participate ingroup 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%

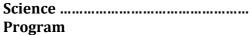
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Midterm	20%
Final Exam/Submission	40%
	Total 100%

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

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

Activity	Duration	Quantity	Work Load	
	(hour)		(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	
		General Sum	259	

ECTS: 10 (Work Load/25-30)

CONTRIBUTION TO PROGRAMME OUTCOMES*

	P01	P02	P03	P04	P05	P06	P07	P08	P09	PO10	P011	PO12	P013	PO14
L01	4	5	3	2	1	0	0	0						
LO2	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	L01
	Activity: Group discussion	<u> </u>
2	Principles of Ionization	L01, L02, L03
	Activity: Group discussion	
3	Introduction of different types of mass spectrometers; Anatomy of mass	L01, L02, L03
	spectrometers	<u></u>
	Activity: Group discussion	
4	Ion source and ionization (APCI, FAB, and others)	L01, L02, L03
	Activity: Group discussion	
5	Matrix-Assisted Laser Desorption/Electropray Ionization	LO1, LO2, LO3
	Activity: Group discussion	
6	Analyzers (Magnetic-Sector, Quadrupole, Time-of-Flight)	LO1, LO2, LO3
	Activity: Group discussion	
7	Analyzers (Ion-trap, FT-ICR)	LO1, LO2, LO3
	Activity: Group discussion	
8	Measures of instrument performance	LO1, LO2, LO3
	Activity: Data analysis	
9	Tandem Mass Spectrometry	LO1, LO2, LO3
	Activity: Group discussion	
10	Interpretation of mass spectra	L01, L02, L03
	Activity: Data Analysis	
11	Interpretation of mass spectra	L01, L02, L03
	Activity: Data Analysis	
12	Applications of mass spectrometry I	LO1, LO2, LO3
	Activity: Group discussion	
13	Applications of mass spectrometry II	LO1, LO2, LO3
	Activity: Group discussion	
14	Student Presentations	LO2, LO3

Prepared by Date