AGU Graduate School of Engineering and Science ……
Program

COURSE RECORD

Code	**BENG620**
Name	**Mass Spectrometry**
Hour per week	3 +0 (Theory + Practice)
Credit	3
ECTS	10
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	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 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%

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** (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
		General Sum	**259**

ECTS: 10 (Work Load/25-30)

CONTRIBUTION TO PROGRAMME OUTCOMES*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
LO1	4	5	3	2	1	0	0	0						
LO2	5	5	5	2	1	0	0	0						
LO4	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	LO1
	Activity: Group discussion	
2	Principles of Ionization	LO1, LO2, LO3
	Activity: Group discussion	
3	Introduction of different types of mass spectrometers; Anatomy of mass spectrometers	LO1, LO2, LO3
	Activity: Group discussion	
4	Ion source and ionization (APCI, FAB, and others)	LO1, LO2, LO3
	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	LO1, LO2, LO3
	Activity: Data Analysis	
11	Interpretation of mass spectra	LO1, LO2, LO3
	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