AGU Graduate School of Engineering and Science ……
Program

COURSE RECORD

Code	**BENG619**
Name	**Proteomics and Metabolomics**
Hour per week	3+0 (Theory + Practice)
Credit	3
ECTS	7,5
Level/Year	Graduate
Semester	Spring
Type	Elective
Location	
Prerequisites	
Special Conditions	
Coordinator(s)	
Webpage	
Content	Introduction to proteome and proteomics technology. General workflow for bottom-up and top-down proteomic approaches. Exploration of differential protein expression, post-translational modifications and protein-protein interactions (PPI). Introduction to metabolome and metabolomics. Metabolite identification, pathway identification and pathway integration.
Objectives	- Learn principles of the most common proteomics techniques - Understand the mass spectrometry based proteomics workflow - Learn experimental design, sample preparation and enrichment of techniques. - Design their own research project by proteomics and metabolomics techniques.
Learning Outcomes	LO1 Students completing this course will be able to learn modern strategies of proteomics and metabolomics. LO2 Students completing this course will be able to evaluate strengths and limitations of mass spectrometry based proteomics workflows. LO3 During this class students will be able to participate in group discussions L04 Student will be able to practice writing process of a research proposal.
Requirements	You need to read assigned research articles before class and participate in-group discussion. You will need write and present a relevant research proposal at the end of the semester.
Reading List	Mass Spectrometry for the Novice, John Greaves and John Roboz, CRC Press 2013. Introducing Proteomics: From Concepts to Sample Separation, Mass Spectrometry and Data Analysis, Josip Lovric, Wiley 2011.
Ethical Rules and Course Policy	

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

Activities	**Number**	**Weight (%)**
Lecture	26	50%
Group Works	13	25%
Presentations	1	25%
Site Visits	0	0
	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 (Computer Lab)	3	3	9
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	**263**

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
LO1	4	5	3	2	1	0	0	0						
LO2	4	4	5	1	1	0	0	3						
LO3	4	5	4	3	5	5	3	1						
LO4	4	5	5	3	5	5	2	3						

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

WEEKLY SCHEDULE

W	**Topic**	**Outcomes**
1	Introduction to proteomics	LO1
	Activity: Group discussion	
2	Experimental strategies in proteomics	LO1, LO2, LO4
	Activity: Group discussion	
3	Basic principles of mass spectrometry based proteomics	LO1, LO2, LO4
	Activity: Group discussion	
4	Interpretation of mass spectrometry data	LO1, LO2, LO4
	Activity: Data analysis	
5	Qualitative proteomics: Protein/peptide identification	LO1, LO2, LO4
	Activity: Data analysis	
6	Quantitative proteomics I	LO1, LO2, LO4
	Activity: Data analysis	
7	Quantitative proteomics II	LO1, LO2, LO4
	Activity: Group discussion	
8	Analysis of post translational modifications	LO1, LO2, LO3, LO4
	Activity: Group discussion	
9	Top-Down proteomics	LO1, LO2, LO3, LO4
	Activity: Group discussion	
10	Proteomics for structural biology	LO1, LO2, LO3, LO4
	Activity: Group discussion	
11	Imaging Mass spectrometry	LO1, LO2, LO3, LO4
	Activity: Group discussion	
12	Interaction proteomics	LO1, LO2, LO3, LO4
	Activity: Group discussion	
13	Student Presentations	LO1, LO2, LO3, LO4
	Activity: Group discussion	
14	Student Presentations	LO2, LO4
	Activity: Group discussion	

Prepared by
Date