AGU Graduate School of Engineering and Science Bioengineering Program

COURSE RECORD

Code	**BENG 547**
Name	**Biocojugate Techniques**
Hour per week	3+0 (Theory+Practice)
Credit	3
ECTS	7.5
Level/Year	Graduate
Semester	Fall / Spring
Type	Elective
Location	Classroom
Prerequisites	-
Special Conditions	Background knowledge of organic chemistry
Coordinator(s)	Dr. İsmail AKÇOK
Webpage	-www.akcoklab.com
Content	This course consists of following subjects: - To determine the functional groups/functions in biological systems and the chemical modifications and the reactions of these targets. - Chemicals used in bioconjugations (Functional chemical cross linkers, tags and probes) and their reactions. - Bioconjugate applications. (Bioconjugations and modifications)
Objectives	- This course aims to teach the chemistry of bioconjugates techniques. - To teach the functional groups, determination of biological targets and potential modifications, and chemical reactions. - To explain the chemicals used in bioconjugation (functional cross linkers, tags, and probes) and their reaction mechanisms. - To understand the specific bioconjugate applications and their reactions.
Learning Outcomes	LO1 Learning functional groups and determining biological targets, and learning their reactions. LO2 Learning the chemical modifications of specific targets. LO3 Learning the chemicals used in bioconjugation (cross-linkers, tags, and probes) and their reaction mechanisms. LO4 Following the current academic researches LO5 Learning the required experimental designs for academic researches
Textbooks	- Greg T. Hermanson, “Bioconjugate Techniques”, ISBN: 0-12-3423-36-8” Academic Press, 1996. - Ravin Narain, “Chemistry of Bioconjugates: Synthesis, Characterization, and Biomedical Applications”, ISBN: 9781118359143, John Wiley & Sons, Inc., 2014.
Ethical Rules and Course Policy	University Ethics (Academic Honesty) Rules

LEARNING ACTIVITIES

Activities	Number	Weight (%)
Lecture	13	50%
Presentations	6	25%
Web search	7	25%
	Total	100

ASSESSMENT

Evaluation Criteria	Weight (%)
Quizzes	10%
Presentations	20%
Midterm	20%
Final Exam/Submission	50%
Total	100%

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

COURSE LOAD

Activity	Duration (hour)	Quantity	Work Load (hour)
In class activities	3	14	42
Research (web, library)	4	14	56
Required Readings	3	14	42
Pre-work for Presentation	4	6	24
Quiz	5	3	15
Studying for Midterm	15	1	15
Studying for Final Exam	30	1	30
		General Sum	**224**

ECTS: 7.5 (Work Load/30)

CONTRIBUTION TO PROGRAMME OUTCOMES*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
LO1	5	0	3	1	5	3	4	5	0	1	1	4	1	5
LO2	5	0	4	1	5	3	4	5	0	1	1	5	1	5
LO3	5	0	5	4	5	4	4	5	0	1	3	5	2	5
LO4	5	0	5	4	5	4	4	5	0	1	4	4	1	5
LO5	5	0	5	4	5	4	4	5	0	1	4	5	2	5

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

WEEKLY SCHEDULE

W	Topic	Outcomes
1	Functional targets	LO1
	Lab/Activity: Lecture, Web Search	
2	Chemistry of reactive groups	LO1, LO2,
	Lab/Activity: Lecture, Web Search	
3	Zero-length Cross-linkers	LO1, LO2, LO3
	Activity: Lecture, Group Work	
4	Homobifunctional, Heterobifunctional and Trifunctional Cross-linkers	LO2, LO3
	Activity: Lecture, Group Work	
5	Cleavable Reagent Systems	LO2, LO3
	Activity: Lecture, Web Search	
6	Tags and Probes	LO2, LO3
	Activity: Lecture, Web Search	
7	Tags and Probes	LO2, LO3
	Activity: Lecture, Web Search	
8	Midterm Exam	

	Activity:	
9	Preparation of Hapten-Carrier Immunogen Conjugates Activity: Lecture, Group Work	L02, LO3, LO4, LO5
10	Antibody Modification and Conjugation / Immunotoxin Conjugation Techniques Activity: Lecture, Group Work	LO3, LO4, LO5
11	Preparation of Liposome Conjugates and Derivatives / Avidin-Biotin Systems Activity: Lecture, Group Work	LO3, LO4, LO5
12	Modification with Synthetic Polymers Activity: Lecture, Group Work	LO3, LO4, LO5
13	Enzyme Modifiction and Conjugation Activity: Web Search, Group Work	LO3, LO4, LO5,
14	Nucleic acid and Oligonucleotide Modification and Conjugation Activity: Group Work, Presentation	LO3, LO4, LO5

Prepared by: Dr. İsmail AKÇOK
Date: May 30, 2019