

**ABDULLAH GUL UNIVERSITY  
GRADUATE SCHOOL OF ENGINEERING & SCIENCE  
BIOENGINEERING DEPARTMENT  
COURSE DESCRIPTION AND SYLLABUS**

Course Name	CODE	SEMESTER	T+L Hour	CREDIT	ECST
multifunctional polymeric nanocarriers	523	FALL- SPRING	3 + 0	3	10

<b>Prerequisite Courses</b>	None
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<b>Course Type</b>	Elective
<b>Course Language</b>	English
<b>Course Coordinator</b>	Assoc. Prof. Dr. Sevil Dinçer İšoğlu
<b>Lecturers</b>	Assoc. Prof. Dr. Sevil Dinçer İšoğlu, Asst. Prof. İsmail Alper İšoğlu
<b>Course Assistants</b>	None
<b>Course Objectives</b>	The importance of nanocarriers on drug delivery, design criteria and methods of a multifunctional nanocarrier
<b>Learning Outcomes</b>	Students, <ul style="list-style-type: none"> <li>• Able to define general properties of multifunctional nanocarriers</li> <li>• Able to analyze pathways of nanocarriers in body, their problems and proposed solutions for these problems</li> <li>• Able to define carrier types</li> <li>• Able to apply knowledge of the methods of polymeric nanoparticles and micelle</li> <li>• Able to realize the importance of controlled polymerization techniques on nanocarriers</li> <li>• Able to identify cross-linked micelles</li> <li>• Able to apply knowledge of stimuli-responsive carrier systems</li> <li>• Able to define drug- conjugated systems</li> <li>• Able to apply knowledge of surface modifications, PEG and target strategies</li> </ul>
<b>Course Content</b>	Design of multifunctional nanocarriers, required attributes of nanocarriers, carrier types, polymeric carriers, nanoparticles and micelles, types of controlled polymerizations, cross-linked micelles, stimuli- responsive carriers, drug- conjugated systems, surface modification, PEG, targeting.

<b>WEEKLY SUBJECTS AND RELATED PRELIMINARY PAGES</b>		
Week	Subjects	Preliminary
1	Design of multifunctional nanocarriers	Course book and related articles
2	Required attributes of nanocarriers	Course book and related articles
3	Carrier types	Course book and related articles
4	Polymeric carriers, nanoparticles and micelles	Course book and related articles
5	Polymeric carriers, nanoparticles and micelles	Course book and related articles
6	Polymeric carriers, nanoparticles and micelles	Course book and related articles
7	Types of controlled polymerizations	Course book and related articles
8	Cross-linked micelles	Course book and related articles
9	Stimuli- responsive carriers	Course book and related articles
10	Midterm	Course notes and book
11	Stimuli- responsive carriers	Course book and related articles
12	Drug- conjugated systems	Course book and related articles
13	Surface modification	Course book and related articles

14	PEG	Course book and related articles
15	Targeting	Course book and related articles
16	Final	Course book and related articles

<b>RESOURCES</b>	
<b>Course Notes</b>	Related course notes and slides
<b>Other Resources</b>	Course book: "Multifunctional Pharmaceutical Nanocarriers", Torchillin, Lee, 1st Edition, 2008, Springer.

<b>MATERIAL SHARING</b>	
<b>Documents</b>	Related course notes and slides
<b>Homework</b>	One assignment about related chapter of this course per week
<b>Exams</b>	One midterm and one final

<b>RATING SYSTEM</b>		
<b>SEMESTER WORKS</b>	<b>NUMBER</b>	<b>CONTRIBUTION</b>
Midterm	1	20
Homework, quiz	14, 14	25,25
<b>TOTAL</b>		70
<b>Success Rate of Semester</b>		70
<b>Success Rate of Final</b>	1	30
<b>TOTAL</b>		100

<b>Course Category</b>	
Basic Sciences and Mathematics	50%
Engineering Sciences	50%
Social Sciences	0%

<b>THE RELATIONSHIP BETWEEN THE LEARNING OUTCOMES AND PROGRAM COMPETENCE</b>						
		Contribution Level				
	No Program Outcomes	1	2	3	4	5
1	Understanding of Life Sciences, Mathematics and Engineering at the post-graduate level, and being able to implement of this knowledge into bioengineering problems					x
2	Having the ability of developing a new scientific method or a technological product or process, and, designing experiments, implementing, collecting data and evaluating regarding these issues					x
3	Choosing technical equipment used in the applications related to bioengineering, having sufficient knowledge in adopting and using new technological equipment					x
4	Having the ability of reaching the information, using resources, contributing to the literature by transferring the process and results of scientific studies as written or verbally in the national and international environments					x
5	Having the ability of working as an individual or a team, in the teams composed of discipline or different disciplines, gaining awareness of leadership and taking responsibility				x	
6	Having advanced level of foreign language knowledge to manage efficient verbal, written and visual communication in the major field				x	
7	Having the understanding of ethics in science and the responsibility in profession with the awareness of lifelong learning, being beneficial to society and sensitiveness to global issues					x
8	Being aware of the social impacts of the solutions and applications of the challenges regarding Bioengineering					x

\*From 1 to 5, it increasingly goes.

<b>ECTS / WORK-LOAD TABLE</b>			
Activities	Activities	Duration (Hour)	Total (Work-Load)
Course Duration (Including exam week: 16x total course hour)	16	3	48

Out of Class Exercise Time (Pre-study, reinforcement)	16	7	112
Searching on Internet, library study	16	3	48
Presentation	5	3	15
Homework	16	3	48
Midterms	1	15	15
Final	1	15	15
<b>Total Work-Load</b>			301
<b>Total Work-Load / 30</b>			301/30
<b>Course ECTS Credit</b>			10