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

Course Name	CODE	SEMESTER	T+L Hour	CREDIT	ECST
Nanocarriers and Drug Delivery	BENG539	Fall-Spring	3 + 0	3	7,5

Prerequisite Courses	None

Course Type	Elective
Course Language	English
Course Coordinator	Erkin Aydin
Lecturers	Erkin Aydin
Course Assistants	-
Course Objectives	Nanotechnology approaches towards drug delivery and types, characteristics, and in vivo behavior of nanocarrier systems will be covered.
Learning Outcomes	Students will have an insight of, • Princilples of drug delivery • Nanotechnology approach in drug delivery • Nanocarrier types and other applications of nanoparticles • Biodistribution and toxcicity of nanocarriers • Formulations in clinical applications.
Course Content	Definition of drug delivery; nanocarrier design, characterization, and types – lipid, inorganic, polymer based nanocarriers, and viruses. Nanoparticles in monitoring, targeting, biodistribution, EPR effect, toxicity, examples from preclinical and clinical stage formulations.

WEEKLY SUBJECTS AND RELATED PRELIMINARY PAGES

Week	Subjects	Preliminary
1	Drug delivery definition	Text book, chapter 1 and literature examples
2	Design of nanocarriers, types, and characteristics	Text book, chapter 1 and literature examples
3	Design of nanocarriers, types, and characteristics	Text book, chapter 1 and literature examples
4	Lipid based nanocarriers	Text book, chapter 3 and literature examples
5	Inorganic nanocarriers	Text book, chapter 3 and literature examples
6	Polymer based nanocarriers	Text book, chapter A and literature examples
7	Polymer based nanocarriers, viruses as drug carriers	Text book, chapter B and literature examples
8	Physicochemical characterization of nanocarriers	Text book, chapter 4 and literature examples
9	Nanocarriers in diagnosis	Related papers will be distributed to students
10	Midterm exam	Lecture notes and textbook
11	Targeting	Text book, chapter 13 and literature examples
12	EPR effect	Text book, chapter 13 and literature examples
13	Biodistribution and toxicity	Related papers will be distributed to students
14	Preclinical examples	Related papers will be distributed to students
15	Clinical stage examples	Related papers will be distributed to students
16	Final exam	Lecture notes and textbook

RESOURCES	
Course Notes	Lecture notes and lecture slides
Other Resources	Textbook: "Nano Based Drug Delivery", Jitendra Naik, Lee, 1st Edition, 2015, IAPC Publishing.

MATERIAL SHARING	
Documents	Lecture notes and lecture slides
Homework	There will be a homework and presentation by each student, topic to be selected by students from the list of related subjects
Exams	1 midterm and 1 final exam

RATING SYSTEM		
SEMESTER WORKS	**NUMBER**	**CONTRIBUTION**
Midterm	1	30
Homework	1	10
Presentation	1	20
TOTAL		60
Success Rate of Semester		60
Success Rate of Final	1	40
TOTAL		100

Course Category	
Basic Sciences and Mathematics	%50
Engineering Sciences	%50
Social Sciences	%0

THE RELATIONSHIP BETWEEN THE LEARNING OUTCOMES AND PROGRAM COMPETENCE

No	Program Outcomes	Contribution Level				
		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.

ECTS / WORK-LOAD TABLE

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	1	18	18
Homework	1	20	20
Midterms	1	20	20

Final	1	35	35
Total Work-Load			301
Total Work-Load / 30			301/30
Course ECTS Credit			7,5