ABDULLAH GÜL UNIVERSITY
GRADUATE SCHOOL OF ENGINEERING & SCIENCE
ADVANCED MATERIALS and NANOTECHNOLOGY PROGRAM
COURSE DESCRIPTION AND SYLLABUS

Course Title	Code	Semester	T+L Hours	Credit	ECTS
Controlled release and drug delivery	AMN560	Spring-Fall	3 + 0	3	10

Prerequisite Courses	Yok

Type	Elective
Language	English
Coordinator	Dr. Erkin Aydın
Instructor	Dr. Erkin Aydın
Adjunt	None
Aim	To learn basic concepts and approaches for controlled release and delivery of drugs
Learning Outcomes	Students will, • Learn general princilpes of drug delivery and release • Learn aims and benefits of controlled release and drug delivery systems • Gain knowledge about nanotechnology enabled and other carrier systems • Leasn nanocarrier and nanoparticle drug delivery applications • Gain knowledge about distribution of nanoparticles in the body and their toxicity • Learns about targeted drug delivery • Familiarize with formulations in the current clinical applicatios •
Course Content	Definitions of controlled release and drug delivery,designs and types of those systems including lipid-,inorganic-,polymer-, and viral-based systems. Nanoparticles in imaging, drug targeting, biodistribution, EPR effect, toxicology, pre-clinical and clinical stage formulations will also be covered.

WEEKLY TOPICS AND PRELIMINARY STUDY

Week	Topic	Preliminary Study
1	Definition, control, advantages, and disadvantages of drug delivery	Course text book and relared papers from the literature
2	Routes of application for classic and controlled drug delivery systems: Intravascular, oral, transdermal, transmucosal, and other routes.	Course text book and relared papers from the literature
3	Main examples for controlled drug release including membrane encapsulated reservoir devices, bioerodible polymers, matrix systems, polymers containing pendant drug substituents, and osmotic systems.	Course text book and relared papers from the literature
4	Nanocarriers: Types, design, and characterization	Course text book and relared papers from the literature
5	Lipid based nanocarriers	Course text book and relared papers from the literature
6	Inorganic nanocarriers	Course text book and relared papers from the literature
7	Polymer based nanocarriers	Course text book and relared papers from the literature
8	Viruses as drug carriers	Course text book and relared papers from the literature
9	Use of nanoparticles in diagnosis and monitoring of diseases	Course text book and relared papers from the literature
10	New drugs based on siRNA and DNA are being developed. Approaches for delivering these large molecules will be discussed. Stabilization of Proteins	Course text book and relared papers from the literature

	& Peptides to prevent loss of activity or the occurrence of aggregation due to hydrolytic, thermal, or other effects	
11	Midterm exam	
12	Drug targeting	Course text book and relared papers from the literature
13	Biodistribution, toxicology, EPR effect	Course text book and relared papers from the literature
14	Preclinical and clinical stage formulation examples	Course text book and relared papers from the literature
15	Student presentations	Several relared papers from the literature
16	Final exam	

SOURCES	
Lecture Notes	Course notes and slides
Other Sources	**Text book:** "Nano Based Drug Delivery", Jitendra Naik, Lee, 1st Edition, 2015, IAPC Publishing.

COURSE MATERIALS SHARING	
Documents	Lectures notes are shared on the internet
Homeworks	Students will be given one homework each week
Exams	Midterm and Final

EVALUATION SYSTEM		
SEMESTER STUDY	**NUMBER**	**CONTRIBUTION**
Midterm exam	1	30
Student presentations	1	10
Homework	1	20
SUB-TOTAL		60
Contribution of Semester Study		60
Contribution of Final Exam	1	40
TOTAL		100

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

RELATIONSHIPS BETWEEN LEARNING OUTCOMES AND PROGRAM QUALIFICATIONS						
No	Program Qualifications	Contribution Level				
		1	2	3	4	5
1	Accessing knowledge, evaluating and interpreting information by doing scientific research in the field of Materials Science and Nanotechnology					**x**
2	Ability to use science and engineering knowledge for development of new methods in Materials Science and Nanotechnology					**x**
3	To be able to understand and analyze materials by using basic knowledge on Materials Science and Nanotechnology					**x**
4	Integrating knowledge of different disciplines with the help of scientific methods, and completion and implementation of scientific knowledge using data					**x**
5	To gain leadership ability and responsibility in disciplinary and interdisciplinary team works				**x**	
6	Gaining language skills to permit communication of written, spoken, and visual materials in the discipline				**x**	

7	Considering scientific and ethical values during the collection and interpretation of data					**x**
8	To be able to contribute to the solution of social, scientific and ethical problems encountered in the field of Materials Science and Nanotechnology					**x**

*Increasing from 1 to 5.

ECTS / WORK LOAD TABLE			
Activities	Number	Duration (Hours)	Total Work Load
Course Length (includes exam weeks: 16x total course hours)	16	3	48
Out-of-class Study Time (Pre-study, practice)	16	7	112
Internet search, library work, literature search	16	3	48
Presentation	1	18	18
Homework	1	20	20
Midterm	1	20	20
Final Exam	1	35	35
Total Work Load			301
Total Work Load / 30			301/30
Course ECTS Credit			10