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

Course Title		Code	Semester	T+L Hours	Credit	ECTS
Advanced Topics in Enzyme Science and Technology	AMN-517	FALL-SPRING	3 + 0	3	10	

Prerequisite Courses	-

Type	Selective
Language	English
Coordinator	Assist. Prof. Kevser Kahraman
Instructor	Assist. Prof. Kevser Kahraman
Adjunt	none
Aim	The aim of the course is to give an advanced knowledge about the fundamental properties of enzymes, their production technology, isolation, purification, immobilization, stabilization, and technical use of enzymes in materials science and nanotechnology and the possibilities to change and improve enzyme performance for adaptation to technical applications.
Learning Outcomes	• Explain the basis, effect and function of enzymes. • Obtain basic knowledge about the relationship between properties and structure of the enzymes, their mechanism of action and kinetics of enzymatic reactions. • Learn the regulatory mechanisms of enzyme activity, enzyme inducers, biosensors and immobilized systems. • Learn the usage of enzymes in medicine, food, organic synthesis, genetics and other areas sectors.
Course Content	• Introduction to enzyme technology • Fundamentals of enzyme kinetics • Enzyme Inhibition • Enzyme preparation techniques • The preparation and kinetics of immobilized enzymes • The large-scale use of enzymes in solution • Safety and regulatory aspects of enzyme use • Immobilized enzymes and their uses • Biosensors • Recent advances in enzyme technology • Future prospects for enzyme technology

WEEKLY TOPICS AND PRELIMINARY STUDY

Week	Topic	Preliminary Study
1	Introduction to enzyme technology	The relevant articles from the literature
2	Fundamentals of enzyme kinetics	The relevant articles from the literature
3	Enzyme Inhibition	The relevant articles from the literature
4	Enzyme preparation techniques I	The relevant articles from the literature
5	Enzyme preparation techniques II	The relevant articles from the literature
6	The preparation and kinetics of immobilized enzymes	The relevant articles from the literature
7	Midterm	
8	Immobilized enzymes and their uses	The relevant articles from the literature
9	The large-scale use of enzymes in solution I	The relevant articles from the literature
10	The large-scale use of enzymes in solution II	The relevant articles from the literature
11	Safety and regulatory aspects of enzyme use	The relevant articles from the literature
12	Biosensors	The relevant articles from the literature
13	Recent advances in enzyme technology	The relevant articles from the literature
14	Future prospects for enzyme technology	The relevant articles from the literature

SOURCES	
Lecture Notes	Lecture slides
Other Sources	**Course Textbook:** "Enzyme Technology", Martin Chaplin and Christopher Bucke, Cambridge University Press, 1990 "Fundamentals of Enzymology", Nicholas Price and Lewis Stevens, Oxford University Press, 1999

COURSE MATERIALS SHARING	
Documents	Lecture notes and slides
Homeworks	There will be 6 homeworks in a semester
Exams	1 Midterm and 1 Final Exam

EVALUATION SYSTEM		
SEMESTER STUDY	**NUMBER**	**CONTRIBUTION**
Midterm	1	20
Homework	6	25
Quiz	8	25
SUB-TOTAL		70
Contribution of Semester Study		70
Contribution of Final Exam	1	30
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 Advanced Materials and Nanotechnology Engineering					**x**
2	Ability to use science and engineering knowledge for development of new methods in Advanced Materials and Nanotechnology Engineering					**x**
3	To be able to understand and analyze materials by using basic knowledge on Advanced Materials and Nanotechnology Engineering					**x**
4	Design and implement analytical, modeling and experimental research					**x**
5	Solve and interpret the problems encountered in experimental research					**x**
6	Considering scientific and ethical values during the collection and interpretation of data				**x**	
7	Integrating knowledge of different disciplines with the help of scientific methods, and completion and implementation of scientific knowledge using data				**x**	
8	To gain leadership ability and responsibility in disciplinary and interdisciplinary team works					**x**
9	To be able to contribute to the solution of social, scientific and ethical problems encountered in the field of Advanced Materials and Nanotechnology Engineering					**x**
10	To be able to define, interpret and create new information about the interactions between various discipline of Advanced Materials and Nanotechnology Engineering					**x**

*Increasing from 1 to 5.

ECTS / WORK LOAD TABLE			
Activities	Number	Duration (Hours)	Total Work Load
Course Length (includes exam weeks: 14x total course hours)	14	3	42
Out-of-class Study Time (Pre-study, practice)	14	5	70
Internet search, library work, literature search	14	5	70
Presentation	7	3	21
Homework	14	5	70
Midterm	1	15	15
Final Exam	1	20	20
Total Work Load			308
Total Work Load / 30			308/30
Course ECTS Credit			10