



COURSE INFORMATION				
Course Code	MSN 530	Course Title	Nanobiotechnology	
Semester	Credits	ECTS	C +P + L Hour	Prerequisites
Spring	3	10	3 + 0+ 0	-

Language of Instruction	Course Level	Course Type
English	Graduate	Elective
<b>Course Coordinator</b>	Dr. Zeliha Cansu Canbek Özdil	
<b>Instructors</b>	Dr. Zeliha Cansu Canbek Özdil	
<b>Assistants</b>		
<b>Goals</b>	The aim of this course is to give a brief introduction to nanotechnology and its applications in biotechnology.	
<b>Content</b>	Nanoparticles and nanostructures, Biomimetics. Microfluidics, Drug delivery, Nanomedicine, Nanobiosensing, Nanoparticle characterization techniques.	
<b>Contribution of the Course to the Professional Education</b>		

Course Learning Outcomes	Detailed Program Outcomes	Teaching Methods	Assessment Methods
Ability to understand nanostructures	1a,1b,4a,9b	1, 2	A, E
Ability to understand characterization of nanoparticles	1b, 9b	1, 2	A, E, G
Ability to propose a nanotechnology based system to be employed in medicine	1b, 9b	1, 2	A, E, G
Ability to report and present nanobiotechnologic devices	1b, 9b	1	A, E
Ability to participate and work as a team	6a, 6b,7c,7d	8,11	F, G



<b>Teaching Methods:</b>	1: Lecture by instructor, 2: Lecture by instructor with class discussion, 3: Problem solving by instructor, 4: Use of simulations, 5: Problem solving assignment, 6: Reading assignment, 7: Laboratory work, 8: Term research paper, 9: Presentation by guest speaker, 10: Sample Project Review, 11: Interdisciplinary group working, 12: ...
<b>Assessment Methods:</b>	A: Written exam, B: Multiple-choice exam C: Take-home quiz, D: Experiment report, E: Homework, F: Project, G: Presentation by student, H: ...

<b>COURSE CONTENT</b>		
<b>Week</b>	<b>Topics</b>	<b>Study Materials</b>
1	Introduction to nanotechnology/ nanobiotechnology concept	Lecture Notes
2	Nanoparticles and nanostructures	Lecture Notes
3	Biomimetic nanotechnology	Lecture Notes
4	Characterization techniques	Lecture Notes
5	Characterization techniques	Lecture Notes
6	Midterm I	
7	Characterization techniques	Lecture Notes
8	Microfluidics / Lab on a chip devices	Lecture Notes
9	Nanomedicine	Lecture Notes
10	Nanobiosensing	Lecture Notes
11	Midterm II	
12	Nanostructures for drug delivery	Lecture Notes
13	Student Assignments	Lecture Notes
14	Student Assignments	Lecture Notes



15 Final Exam

**RECOMMENDED SOURCES**

**Textbook**

There is not a textbook for this course but any book covers the techniques presented in the course description will be helpful. Handouts and papers will be distributed to the students on relevant topics during the semester.

**Additional Resources**

**MATERIAL SHARING**

**Documents** Lecture Notes

**Assignments** Presentations

**Exams** Exams and solutions

**ASSESSMENT**

<b>IN-TERM STUDIES</b>	<b>NUMBER</b>	<b>PERCENTAGE</b>
Midterm	2	40
Assignment	1	20
Final		40
<b>Total</b>		<b>100</b>
<b>CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE</b>		40
<b>CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE</b>		60
<b>Total</b>		<b>100</b>

**COURSE CATEGORY**

Field Course

**COURSE'S CONTRIBUTION TO PROGRAM OUTCOMES**

No	Program Learning Outcomes	check √
1a	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline,	√
1b	Ability to use theoretical and applied knowledge in these areas in complex engineering problems.	√
2a	Ability to identify, formulate, and solve complex engineering problems,	√



2b	Ability to select and apply proper analysis and modeling methods for this purpose.	√
3a	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result,	√
3b	Ability to apply modern design methods for this purpose.	√
4a	Ability to devise, select and use modern techniques and tools needed for analyzing and solving complex problems encountered in engineering practice.	√
4b	Ability to employ information technologies effectively.	√
5a	Ability to design experiments for investigating complex engineering problems or discipline specific research questions,	√
5b	Ability to conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.	
6a	Ability to work efficiently in intra-disciplinary teams,	√
6b	Ability to work efficiently in multi-disciplinary teams,	√
6c	Ability to work individually.	√
7a	Ability to communicate effectively in Turkish, both orally and in writing,	
7b	Knowledge of a minimum of one foreign language,	
7c	Ability to write effective reports and comprehend written reports, prepare design and production reports,	
7d	Ability to make effective presentations,	
7e	Ability to give and receive clear and intelligible instructions.	
<b>8a</b>	Recognition of the need for lifelong learning, ability to access information, ability to follow developments in science and technology,	
<b>8b</b>	Ability to continue to educate him/herself.	
<b>9a</b>	Consciousness to behave according to ethical principles and professional and ethical responsibility.	
<b>9b</b>	Knowledge on standards used in engineering practice.	
<b>10a</b>	Knowledge about business life practices such as project management, risk management, change management.	
<b>10b</b>	Awareness in entrepreneurship and innovation.	
<b>10c</b>	Knowledge about sustainable development.	
<b>11a</b>	Knowledge about the global and social effects of engineering practices on health, environment, and safety,	
<b>11b</b>	Knowledge about contemporary issues of the century reflected into the field of engineering.	
<b>11c</b>	Awareness of the legal consequences of engineering solutions.	



<b>ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION</b>			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	6	84
Midterm examinations	2	3	6
Final exam	1	3	3
<b>Total Work Load</b>			135
<b>Total Work Load / 25 (h)</b>			5,4
<b>ECTS Credit of the Course</b>			10

Prepared by: Dr. Sevim Manolya Hatipoglu	Preparation date: 01/01/2021
Updated by: Dr. Zeliha Cansu Canbek Özdil	25/10/2022