DEPARTMENT OF MOLECULAR BIOTECHNOLOGY
COURSE SYLLABUS

Course Details

Code	Academic Year			Semester
MBT477	4			7
Title	**T**	**A**	**L**	**ECTS**
Nanobiotechnology	3	0	2	6

Language	German					
Level	**Undergraduate**	**X**	**Graduate**		**Postgraduate**	
Department / Program	Molecular Biotechnology					
Forms of Teaching and Learning	Face-to-face					
Course Type	**Compulsory**		**Elective**	**X**		
Objectives	Students gain knowledge of the fundamentals of nanotechnology. They learn about natural nanostructured systems from biology and methods and procedures for producing and characterizing artificial nanostructures. Students are introduced to scientific thinking and learn to work out experimental solutions.					
Content	Synthesis and characterization of nanostructures and nanomaterials: metallic nanoparticles, carbon nanotubes, graphene, quantum dots, protein- and DNA-based structures, liposomes Applications of nanomaterials: analytics (immunoassays), bioelectronics (biosensors, biochips), medicine (stem cells, tissue replacement materials, and cell encapsulation), cosmetics (anti-aging), pharma (drug delivery systems) and environment (drinking water treatment).					
Prerequisites	-					
Coordinator	Assoc. Prof. Dr. Aysu Yarman					
Lecturer(s)	Assoc. Prof. Dr. Aysu Yarman					
Assistant(s)						
Work Placement	No					

Recommended or Required Reading

Books / Lecture Notes	1.Renneberg R., Berkling V. „Biotechnologie für Einsteiger“, Springer Spektrum, 2012 2.Renugopalakrishnan V., Lewis R.V. „Bionanotechnology: Proteins to Nanodevices”, Springer, 2006 3.Goodsell D.S. „Bionanotechnology Lessons from Nature”, John Wiley & Sons, Inc., 2004 4.Papazoglou E.S., Parthasarathy A. „BioNanotechnology”,Morgan and Claypool Publishers, 2007 5.Anderson J. „Micro and Nanotechnologies in Engineering Stem Cells and Tissues”, Wiley-IEEE Press, 2013 6.Jopp K. „Nanotechnologie – Aufbruch ins Reich der Zwerge, 2. Auflage“ , Gabler Verlag, 2006
Other Sources	

Additional Course Material

DEPARTMENT OF MOLECULAR BIOTECHNOLOGY
COURSE SYLLABUS

Documents		
Assignments		
Exams		
Course Composition		
Mathematics und Basic Sciences	20	%
Engineering	10	%
Engineering Design		%
Social Sciences		%
Educational Sciences	30	%
Natural Sciences	40	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	20
Quiz	0	0
Assignments	0	0
Attendance	0	0
Recitations	0	0
Projects	1	20
Final Exam	1	60
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	13	3	39
Self-Study	13	3	39
Assignments	-	-	-
Presentation / Seminar Preparation	1	12	12
Midterm Exam	1	12	12
Recitations	-	-	-
Laboratory	3	8	24
Projects	1	8	8
Final Exam	1	16	16
		Total Work Load	**150**
		ECTS Points (Total Work Load / Hour)	**6**

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Learning Outcomes	
1	Having knowledge about nanostructures in biological systems
Weekly Content	
1	Introduction
2	Carbon Nanomaterials-1
3	Literature survey
4	Carbon Nanomaterials-2
5	Literature survey
6	Nanoparticles Without Carbon-Part 1
7	Nanoparticles Without Carbon-Part 2
8	Literature survey
9	Characterization of nanostructures
10	Seminar
11	Seminar
12	Seminar
13	Seminar

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
1	5	5	5	5	3	5	1

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
https://obs.tau.edu.tr/oibs/bologna/progLearnOutcomes.aspx?lang=en&curSunit=5707	
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