

**School of Engineering and Natural Sciences / Biomedical Engineering (English)**

**2024 - 2025 Academic Year**

**POLYMERIC BIOMATERIALS**

**Syllabus**

<b>Course Description</b>					
<b>Name</b>	<b>Code</b>	<b>Semester</b>	<b>T+A Hour</b>	<b>Credit</b>	<b>ECTS</b>
POLYMERIC BIOMATERIALS	BME4149440	Fall Semester	3+0	3	6
<b>Prerequisites Courses</b>	BİYOMALZEMELER				
<b>Recommended Elective Courses</b>	Tissue and Genetic Engineering				
<b>Language of Instruction</b>	English				
<b>Course Level</b>	First Cycle (Bachelor's Degree)				
<b>Course Type</b>	Elective				
<b>Course Coordinator</b>	Prof.Dr. Yasemin YÜKSEL DURMAZ				
<b>Name of Lecturer(s)</b>	Prof.Dr. Yasemin YÜKSEL DURMAZ				
<b>Assistant(s)</b>	Teaching Assistant				
<b>Aim</b>	The aim of the course is to gain the knowledge about the preparation methods, modifications, properties and applications of polymer biomaterials. We look in detail at the various classes of materials considering aspects of their synthesis, fabrication and properties such as physical, thermal and mechanical that make them suitable for medical applications. Various applications of polymeric Biomaterials will be exemplified.				
<b>Course Content</b>	This course contains; Overview of Biomaterials, Type of Biomaterials and Introduction to Polymeric Biomaterials, Classification of Polymers and Natural Polymers, Synthetic Polymers, Characterization of Polymers, Thermal and Mechanical Properties of Polymers, Biocompatibility and Biodegradability of Polymers, Current Polymeric Biomaterials in the Field, Polymeric Biomaterials for Drug Delivery, Polymeric Biomaterials for Medical Implants and Devices, Polymeric Biomaterials for Tissue Engineering, Hydrogels, Shape Memory Polymeric Biomaterials.				
<b>Course Learning Outcomes</b>			<b>Teaching Methods</b>	<b>Assessment Methods</b>	
Recognizes the polymeric biomaterials			14, 16, 17, 9	A, E, F	
Recognizes the general synthesis and characterization methods of polymers.			14, 16, 17, 9	A, E, F	
Determines the required material properties based on desired applications.			14, 16, 9	A, E, F	
Assess the advantages and disadvantages of polymeric drug delivery systems.			14, 16, 9	A, E, F	
Suggests polymeric biomaterials for the problem related to the discussed topics.			14, 16, 17, 9	A, E, F	
Compares the properties that polymeric biomaterials may have according to their preparation methods.			14, 16, 9	A, E, F	
Designs a solution system consisting of polymeric biomaterials for a specific problem			14, 16, 9	A, E, F	
<b>Teaching Methods</b>	14: Self Study Method, 16: Question - Answer Technique, 17: Experimental Technique, 9: Lecture Method				
<b>Assessment Methods</b>	A: Traditional Written Exam, E: Homework, F: Project Task				
<b>Lecture Schedule</b>					
<b>Sequence</b>	<b>Topics</b>	<b>Preliminary Preparation</b>			
1	Overview of Biomaterials, Type of Biomaterials and Introduction to Polymeric Biomaterials				
2	Classification of Polymers and Natural Polymers				
3	Synthetic Polymers				
4	Synthetic Polymers				
5	Characterization of Polymers				
6	Thermal and Mechanical Properties of Polymers				
7	Biocompatibility and Biodegradability of Polymers				
8	Current Polymeric Biomaterials in the Field				
9	Polymeric Biomaterials for Drug Delivery				
10	Polymeric Biomaterials for Medical Implants and Devices				
11	Polymeric Biomaterials for Tissue Engineering				
12	Hydrogels				
14	Shape Memory Polymeric Biomaterials				
<b>Evaluation Methods</b>		<b>Weight(%)</b>			
Midterm Exam		30			
General Exam		70			
<b>Resources</b>					
Polymeric Biomaterials, Revised and Expanded, Severian Dumitriu, 2001 by CRC Press, ISBN 9780824705695 <a href="http://pslc.ws/macrog/maindir.htm">http://pslc.ws/macrog/maindir.htm</a>					