Course Title	**Polymers in Medical Applications**				
Course Code	**MME 555**				
Course Type	**Elective**				
Level	Graduate				
Year / Semester	Fall semester (offered every 2nd year)				
Teacher's Name	Theodora Krasia				
ECTS	8	Lectures / week	1x3 hrs	Laboratories / week	--
Course Purpose and Objectives	During the last decades, polymers have been the key-players in the development of new materials destined for use in medical and biomedical applications. The latter include therapy, diagnostics, bioseparation, biosensing, biocatalysis, etc. This course aims in providing an overview on the use of polymeric materials and polymer-based nanocomposites in the biomedical field.				
Learning Outcomes	• Acquire general knowledge and understanding on polymers, their thermomechanical properties and structure-to-property relation. • Discuss on the properties of polysiloxanes and their use in biomedical applications. • Discuss on the use of polymers and polymer composites in dental applications. • Acquire knowledge on hydrogels in terms of synthesis, properties, and biomedical applications. • Recognize the use of polymers in drug and gene delivery and discuss on various parameters influencing the drug delivery process. • Discuss on the use of polymer-based nanofibers in biomedicine and biotechnology. • Discuss on the applications of SPIONs and biofunctionalized carbon nanotubes.in biomedicine. • Acquire knowledge and discuss on blood contacting polymeric materials. **General learning outcomes:** • Develop presentation skills through oral presentations in class • Retrieve and analyse scientific manuscripts on the topic.				
Prerequisites	NO		Required	NO	

Course Content	Polymers – introduction. Polysiloxanes in biomedical applications. Biodegradable polymers. Polymers in dental and maxillofacial applications. Medical applications of hydrogels. Polymers in therapeutic applications. Polymeric nanofibers in biomedical and biotechnological applications. Polymer-stabilized superparamagnetic iron oxide nanoparticles. Blood contacting polymers. Polymer-carbon nanotube composites in medical applications.
Teaching Methodology	- Lectures (in the form of ppt. presentations) - Use of audio and video tools - Lab demonstrations - Presentations by students Communicative, Collaborative During the first week of the semester, the Syllabus of the course is given by the teacher, which includes information on the course content, expected learning outcomes, assessment and office hours
Bibliography	• *Polymeric Biomaterials*, 2nd Ed. Revised and Expanded, Ed. S. Dumitriu, Marcel Dekker Inc. NY, 2002. **ISBN**: 0-8247-0569-6 • *Magnetic Nanoparticles: Synthesis, Physicochemical Properties and Role in Biomedicine, (Editor: Nora P. Sabbas),* Nova Science Publishers, Inc. USA, 163-199, **2014 , ISBN:** 978-1-63117-434-6 • *Nanoscale Drug delivery/Drug Design in Nanomedicine – Basic and clinical Applications in Diagnostics and Therapy* (Editor: Alexiou C), Else Kröner-Fresenius Symp. Basel, Karger, vol. 2, 35-52, **2011**. **ISBN:** 978-3-8055-9818-7 • Scientific manuscripts and review articles • 3. Course handouts (http://www.eng.ucy.ac.cy/krasia/)
Assessment	Midterm Examination: 35 % Oral Presentations: 15 % Final Examination: 50%
Language	English