

Course name: Biomaterial engineering in medicine (USOS Code: B-BM.081Eng)

ECTS: 1

No. of hours: 15 (15 lectures + 0 classes)

Course coordinator: Dr hab. Monika Osińska-Jaroszuk, prof. UMCS

Prerequisites: General knowledge of chemistry and physics

Course description: General characterization of biomaterials - definition, properties. Requirements for biomaterials -biocompatibility, biotolerance, biofunctionality. Division and types of biomaterials used in medicine: ceramic, metallic, metal alloys, composite and polymers. Corrosion of metallic implants. Surface modifications of biomaterials. Tissue response to implants (normal wound-healing process, body response to implants). Biological testing of biomaterials (*in vitro* and *in vivo* assessment of tissue compatibility, assay methods). Physical and chemical testing of biomaterials. Degradation of biomaterials in the biological environment (chemical and biochemical degradation of polymers). Application of biomaterials in medicine, biology and cosmetology. Biomaterials as a drug carriers.

Recommended literature: Wong J.Y., Bronzino J.D. 2007 Biomaterials CRC Press is an imprint of the Taylor & Francis Group; Rattner B.D., Hoffman A.S., Schoen F.J, Lemons J.E. 2004 Biomaterials Science An Introduction to Materials in Medicine 2nd Edition Elsevier Academic Press; Park J., Lakes R.S. 2007 Biomaterials An Introduction Third Edition Springer Science&Business Media, LLC.