



## ЦЕНТЪР ЗА ОБУЧЕНИЕ – БАН

1000 София  
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### Basic Information:

Course Title: Polymers in Modern Medicine  
Lecturer: Prof. Petar Dimitrov Petrov, IP-BAS  
Phone: 0878129858  
Email: [ppetrov@polymer.bas.bg](mailto:ppetrov@polymer.bas.bg)  
Total Teaching Hours: 30

### Annotation (up to 150 words)

The present course provides a comprehensive overview of all different types of polymers used in medical device applications. Particular attention is paid to those materials with actual commercial applications, along with supporting data from preclinical and clinical trials. The synthesis, properties and performance of each polymer or family of polymers are described in some detail as well. The focus is on those properties that are important and relevant to medical device applications, such as chemical resistance, sterilization capability, and biocompatibility. The relevant methods for processing of different plastics for medical device applications are reviewed. This course is intended for PhD students and researchers who work in the area of polymers and biomedical materials.

### Course content (brief description by topics or modules)

Topic / Module 1: General information and descriptions. History of biomaterials.

Topic / Module 2: Commodity Thermoplastics

Topic / Module 3: Engineering Thermoplastics

Topic / Module 4: High-performance Thermoplastics. Elastomers. Resins.

Topic / Module 5: Biodegradable Natural and Synthetic Polymers.

Topic / Module 6: Water-soluble Polymers and Hydrogels.

Topic / Module 7: Stimuli-responsive Polymers. Amphiphilic Copolymers.

### Teaching and assessment methods

Teaching – all 3 types

Assessment: test (written) and discussion

### Competencies acquired as a result of training (3–5 points)

Basic knowledge of the types of polymers with applications in medicine;

Specific knowledge of the properties of polymers, determining their specific applications for the manufacture of medical devices;

Specific knowledge of the most modern polymer systems and devices in medical practice.

### Literature:

**Biomaterials Science. An Introduction to Materials in Medicine**, Edited by: Buddy D. Ratner, Allan S. Hoffman, Frederick J. Schoen and Jack E. Lemons, 2013, ISBN: 978-0-12-374626-9; DOI: 10.1016/C2009-0-02433-7

**Biodegradable Polymers in Clinical Use and Clinical Development**, Edited by Abraham J. Domb, Neeraj Kumar, and Aviva Ezra, 2011, ISBN: 978-0-470-42475-9

**Handbook of Engineering and Specialty Thermoplastics: Water Soluble Polymers**,

Author(s): Johannes Karl Fink, 2011, ISBN: 9781118062753, |DOI: 10.1002/9781118087732



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**Additional information** (optional) (e.g., special requirements, laboratory equipment, prior knowledge)

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