



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Novel polymer materials [S1IMat1>NMP]

### Course

Field of study

Materials Engineering

Year/Semester

3/6

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

### Number of hours

Lecture

15

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

dr hab. inż. Karol Bula prof. PP  
karol.bula@put.poznan.pl

### Lecturers

### Prerequisites

The student should have basic knowledge of the material science of polymer materials, methods of microstructure testing and functional properties of polymeric materials.

### Course objective

Getting to know modern polymer materials, their functional properties and directions of application.

### Course-related learning outcomes

Knowledge:

the student has detailed knowledge of novel polymer engineering materials, functional materials with special physical properties.

the student has a basic knowledge of development trends in materials engineering, regarding material design, can define the principles of selection of engineering materials.

Skills:

the student is able to describe the groups of materials, knows the material selection system, can integrate the obtained information and interpret it.

the student is able to formulate engineering tasks concerning the selection of materials for specific applications, can compare the operational properties of materials.

Social competences:

the student is aware of the non-technical aspects and effects of engineering activities, including the impact on the environment.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture

Written colloquium at the end of the semester, open questions (evaluation scale based on a percentage rate: do 50% unsatisfactory (F), 50-60% poor (E), 60-70% satisfactory (D), 70-80% good (C), 80-90% good + (B), >90% very good (A)), conducted at the end of the semester.

### Programme content

1. Polymeric materials with biocidal and biodegradability properties.
2. Polymeric materials used in medical applications.
3. Polymeric materials for barrier and other applications.
4. Self-healing polymers.

### Course topics

Self healing polymers, chemosetting and light-curing, super-barrier materials for packaging applications, biodegradable and biocidal polymeric materials, special materials - polymer gels, polymer capsules. Polymer materials for applications in bone implants. Polymer materials for use in ballistic shields. Thermostable polymeric materials, chemically resistant to high temperatures. Material science of new thermoplastic elastomers.

### Teaching methods

Lecture: multimedia presentation illustrated with examples given on a board.

### Bibliography

Basic

1. Rabek J.F.: Polimery i ich zastosowania interdyscyplinarne, tom 1 i 2, wyd. PWN, W-wa 2020.
2. Ehrenstein G. W., Brocka-Krzemińska Ż.: Materiały polimerowe, wyd. PWN, W-wa 2016.
3. Garbarski J. i in.: Części maszyn z tworzyw sztucznych, Oficyna Wydawnicza Politechniki Warszawskiej, W-wa 2016.

Additional

1. Rabek J.F.: Polimery, wyd. PWN, W-wa 2017.
2. Zazakowny K.: Nowe materiały polimerowe dla potrzeb biomedycznych, Wydawnictwo Bezkras Wiedzy, Chisinau 2014.
3. Inamuddi A.M., Asiri M. (Ed.): New Polymeric Composite Materials - Environmental, Biomedical, Actuator and Fuel Cell Applications, wyd. Materials Research Forum LLC, 2016.

### Breakdown of average student's workload

|   | Hours | ECTS |
|---|-------|------|
| Total workload  | 50    | 2,00 |
| Classes requiring direct contact with the teacher   | 25    | 1,00 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 25    | 1,00 |