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| **Course code** | CC1 |
| **Type and description** |  |
| **ECTS credit** | 1 |
| **Course name** | **World trends in materials engineering** |
| **Course name in Polish** | **Światowe trendy w inżynierii materiałowej** |
| **Language of instruction** | English |
| **Course level** | 8 PRK |
| **Course coordinator**  | **Prof. Kula Piotr, phD., D.Sc.** |
| **Course instructors** | **DSc eng. Zbigniew Draczynski** |
| **Delivery methods and course duration** |

|  | **Lecture** | **Tutorials** | **Laboratory** | **Project** | **Seminar** | **Other** | **Total of teaching hours during semester** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Contact hours | 15 |  |  |  |  | 0 | 15 |
| E-learning | No | No | No | No | No | No |  |
| Assessment criteria (weightage) | 0,00 |  |  |  |  | 0,00 |  |

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| **Course objective** | The aim of the course is:1. Introduce PhD to the world trends in materials engineering,
2. Enable students to acquiring knowledge of new trends in the field of engineering polymer materials.
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| **Learning outcomes** | PhD student is able;1. Describe the state of art and world trends in Materials Engineering,
2. Define basic mechanical properties of engineering materials.
3. Define methods for molding of engineering materials properties
4. Classify polymers used in material engineering with regard to chemical structure, their physicochemical properties and processing capabilities. – effects - W1 P8S\_EG, U1 P8S\_UW2. 4
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| **Assessment methods** | Verification methods of learning outcomeseffects W1 P8S\_EG, U1 P8S\_UW2. 4- written examThe final grade consists of:The result of the written exam - 100% |
| **Prerequisites** |  |
| **Course content with delivery methods** | LECTURE1. Etymology of “engineering materials” and importance of it for modern technology,
2. Basic definition of engineering materials: metals, ceramic, polymers, composites,
3. Chemical bounds and their relationship with materials properties,
4. Mechanical properties of materials,
5. Structural defects and their influence on materials properties,
6. Surface layer and its technological modification,
7. Industrial equipment for surface engineering,
8. World trends in heat treatment and thermo-chemical treatment,
9. Basic knowledge in the field of macromolecular compounds.
10. Polymers in a condensed state.
11. Degradation of macromolecular compounds.
12. Configuration of the macromolecule. The size and shape of the macromolecule.
13. Polymer solutions. Polydispersity of polymers. Functions of molecular weight distribution.
14. Innovative techniques of processing polymeric materials
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| **Basic reference materials** | 1. The lecturer's material,
2. Blicharski M.: Wstęp do inżynierii materiałowej. WNT, Warszawa, 1998.
3. Połowiński S.: Chemia fizyczna polimerów, Wydawnictwo Politechniki Łódzkiej, Łódź, 2001 r.
4. Praca zbiorowa, Chemia polimerów, tom I-III, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1997 r.
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| **Other reference materials** | 1. Kula P.: Inżynieria warstwy wierzchniej. Monografia PŁ, Łódź, 2000,
2. Guy A.G., "Wprowadzenie do nauki o materiałach", PWN 1977
3. Przybyłowicz K., "Podstawy teoretyczne metaloznawstwa", WNT Warszawa 1999
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| **Average student workload outside classroom** | 10 |
| **Comments** |  |
| **Last update** |  |