

# Informačný list predmetu

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| <b>Vysoká škola:</b> Žilinská univerzita   |   |
| <b>Fakulta:</b> Strojnícka fakulta   |   |
| <b>Kód predmetu:</b> 2Y013   | <b>Názov predmetu:</b> Materials Science (MS_E) |
| <b>Druh, rozsah a metóda vzdelávacích činností:</b> 2 - 0 - 2 (prednášky-cvičenia-lab.cv.) hodín za týždeň, prezenčná metóda výučby.   |   |
| <b>Počet kreditov:</b> 5.0   |   |
| <b>Odporúčaný semester/trimester štúdia:</b> 2 semester  |   |
| <b>Stupeň štúdia:</b> 4  |   |
| <b>Podmieňujúce predmety:</b>  |   |
| <b>Podmienky na absolvovanie predmetu:</b><br><i>Priebežné hodnotenie:</i><br><br><i>Záverečné hodnotenie:</i><br>Written and oral exam.<br>Final classification of the subject:<br>Evaluation A: 93 - 100 points<br>Evaluation B: 85 - 92 points<br>Evaluation C: 77 - 84 points<br>Evaluation D: 69 - 76 points<br>Evaluation E: 61 - 68 points<br>FX Evaluation: Less than 61 points<br><br><i>Minimálny počet bodov pre prihlásenie na skúšku nie je zadany</i>  |   |
| <b>Výsledky vzdelávania:</b><br>The aim of the subject is to make the acquaintance of generally valid relationships between the structure and properties of metals and their alloys, the relationships of the creation of iron alloy structures, the influence of heat treatment on the structures of iron alloys.   |   |
| <b>Stručná osnova predmetu:</b><br>Lectures:<br>• Crystal structure of metals and alloys. Disorders of crystal structure and diffusion. Labeling of cryst. planes and directions. Crystallization of pure metals. Introduction to equilibrium diagrams. Equilibrium diagrams and crystallization of alloys. Phase transformations in the solid state. Systems of iron with carbon. Accompanying and additive elements in steels. Structure of alloy steels. Phase transformations during heat treatment. Thermal and chemical-thermal processing procedures. Physical properties of metals. Corrosion resistance. Mechanical properties of materials. Deformation and crystallization. Violation of materials. Fracture mechanics. Fatigue and creep.<br><br>Exercises:<br>• Crystallography. Basic equilibrium diagrams. Combined equilibrium diagrams. Systems of iron with carbon. Hardenability.<br><br>Laboratory exercises:<br>• Tensile test. Impact test in bending. Hardness tests. Fatigue tests. Basics of light microscopy. Microstructures of steels and cast irons. Basic microstructures of iron-carbon alloys. Microstructures of steels after heat treatment. Non-destructive testing of materials. |   |
| <b>Odporúčaná literatúra:</b>  |   |

- Skočovský, P. - Bokůvka, O. - Konečná, R. - Tillová, E. 2015. Náuka o materiáli. 2 vyd. Žilina: EDIS, 2015. 349 s. ISBN 978-80-554-0871-2.
- Bokůvka, O. - Konečná, R. - Tillová, E. - Skočovský, P. 2018. Materiály I. Návod na cvičenia. 2. vyd. Žilina: EDIS, 2018. 86s. ISBN 978-80-554-1512-3.
- Lynch, Ch.T.: Handbook of Materials Science, Taylor & Francis Ltd, 2021, 448 p.
- Callister, W.D.: Materials Science and Engineering, John Wiley & Sons, 2014, 936 p.
- Callister, W.D. - Jordan, R. - Rethwisch, D.G.: Callister's Materials Science and Engineering, John Wiley & Sons, 2020, 944 p.
- Green, A.: Materials Science for Engineers, NY Research Press, 2016, 288 p.
- Moran, M.: Materials Science and Metallurgy, Larsen and Keller Education, 2017, 260 p.
- Kuhn, H. - Medlin, D.: ASM Handbook, Volume 8: Mechanical Testing and Evaluation, ASM International, 2000, 998 p.
- Kyriakos, K.: Mechanical Testing of Engineering Materials, Univ Readers, 2017.
- ASM Handbook, Volume 10: Materials Characterization ASM International, 2019, 807 p.

**Jazyk, ktorého znalosť je potrebná na absolvovanie predmetu:** English

**Poznámky:**

**Hodnotenie predmetov:**

Celkový počet hodnotených študentov:

| A | B | C | D | E | FX |
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**Vyučujúci:**

**Dátum poslednej zmeny:** 2022-12-07

**Schválil:** prof. Ing. Eva Tillová, PhD.