**Materials and thermal treatment (ECTS credits: 6)**

Language: the course is offered in Serbian and Hungarian.

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**Course description:**

The course focuses on basic metallurgy. Throughout the course, the students will be familiarized with the metal structure and their properties, and they will learn the ways to analyze the Fe-C diagram in detail. They will be introduced to the types of steel and cast iron along with the properties of copper, aluminum and their alloys. In the last quarter of the course, students will deal with polymeric materials, ceramics, and composite materials. During the laboratory exercises, students will study the methods for determination and measurement of the basic properties, such as strength, hardness, toughness, and plasticity.

This course would cover the following topics, both as lectures and exercises:

1. Introduction
2. Material structure and crystallization
3. Mechanical properties of materials
4. Diagrams of alloy state
5. Fe-c state diagram
6. Iron and iron alloys
7. Thermal treatment. Basics
8. Anching
9. Hardening
10. Thermochemical treatments
11. Colored metals
12. Polymer materials
13. Ceramic materials
14. Composite materials
15. Closing remarks

**Aims:**

* Acquiring knowledge of machine materials and their selection
* Acquiring knowledge of the structure and properties of materials
* Acquiring knowledge of the methods to improve properties

**Learning outcomes:**

After completing this course the student should be able to:

* independently choose the most suitable material for specific needs
* independently prescribing the necessary technology of heat treatment of materials
* independently perform the necessary control actions and measurements to determine the properties of the selected material