Tárgytematika / Course Description

Materials Science Fundamentals

AJNB_ATTA017

Tárgyfelelős neve / Teacher's name: dr. Hargitai Hajnalka
Félév / Semester: 2022/23/2
Beszámolási forma / Assesment: Folyamatos számonkérés
Tárgy heti óraszáma / Teaching hours(week): 1/2/1
Tárgy féléves óraszáma / Teaching hours(sem.): 0/0/0

OKTATÁS CÉLJA / AIM OF THE COURSE

The subject of the BSc course deals with the systematic discussion of modern materials used in mechanical engineering and vehicle industry applications, the characterization of the materials, the methods of modification of the properties. It describes the material structure of industrial materials, the typical crystal structure and thermal behaviour of metals and alloys, the carbon steel alloy system, the steel heat treatment processes and the associated changes in structure and properties, as well as the basic material testing procedures commonly used in practice.

Ability: The student is able to acquire the knowledge in his / her contexts and applied at engineering level, and develop his / her professional skills and experiences based on the acquired knowledge.

Attitude: Students are able to interpret and synthesize the techniques used in modern engineering, automotive and automotive applications, methods that characterize materials, and the practical procedures for modifying and their properties during the theoretical design and practical engineering work.

Autonomy, responsibility: After completing the course, the student can undertake planning and qualification of materials engineering and heat treatment technology with professional supervision.

TANTÁRGY TARTALMA / DESCRIPTION

Crystalline structures

Thermal behavior of pure metals and their alloys

Binary equilibrium phase diagrams

Iron-carbon equilibrium phase diagram and alloy system

Non equilibrium phase transformations

The basics of steel heat treatment process

Full cross sectional heat treatment

Surface hardening methods, classification, characterization

Classification of engineering materials, Tensile test, Compression test, Bending test, Hardness test method

Testing of heat treated steel parts

Ductile-rigid behaviuor, Charpy impact test, Fatigue

Standard designation of steels and other engineering materials

Cast irons, Effect of alloying elements on the properties of iron based alloys

Types, properties and application of structural steels and tool steels, Nonferrous metals

Ceramics, Polymers and Polymer Composites

SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

Terms of Signature:
- visit the lectures

Exam:
- completion of a semester and starting exam period signature is required
- during the examination period the student must take a written exam
- the exam is successful if the 50% result is achieved

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

of Materials, Global Engineering, 2011, ISBN-10: 0-495-29602-3,
(2) Lecture notes (szelearnig)