Óbuda University Bánki Donát Mechanical Safety Engineering Faculty	**Institute of Materials Science and Manufacturing** Department of Materials and Metal Forming
Name of the subject: **Engineering Materials**	*NEPTUN-code:* BAGMN11NED
Subject leader: dr. Pál Rácz	*Title:* associate professor

Course description:

Fundamentals of materials testing, mechanical, physical metallurgical and non-destructive testing methods. Atomic and higher structures of metals, polymers, ceramics and composites. Solidification and crystalline structure of metals. Interpretation of the equilibrium diagram and its information content. Iron-carbon alloys. The process of cold forming and recrystallisation and the consequences in practice. Structure, types and processing of polymers. Structure and properties of ceramics and composite materials.

Lessons per Week:	Lectures: 3	Labs: 0	Practice: 2	Consultation by request
Evaluation:	practice mark			

1. Lecture program

Date	Subject
09.08.	General overview of engineering materials. Tensile test. Brinell, and Vickers hardness tests. Impact test.
09.15.	Crystal structure of metals. Ideal crystals.
09.22.	Crystal structure of metals. Real crystals, imperfections in crystals.
09.29.	Crystallisation of metals and alloys. The structure of alloys.
10.06.	Deformation, strain hardening, recrystallization.
10.13.	Phase diagrams.
10.20.	Iron-carbon phase diagram. Metastable system. Steels.
10.27.	Test #1
11.03.	Iron-carbon phase diagram. Stable system. Cast irons.
11.10.	Non-equilibrium transformation of steels.
11.17.	Structure, types and processing of polymers.
11.24.	Structure and properties of ceramics and composite materials.
12.01.	Test #2
12.08.	Repeater tests

2. References

J. Verebély-Dévényi, P. Rácz: Engineering materials, Óbuda University, 2012.
R. E. Smallman, R. J. Bishop: Modern Physical Metallurgy and Materials Engineering, Butterworth-Heinemann
P. Rácz: Lecture presentation slides; www.elearning.uni-obuda.hu

3. Requirements

a) Taking part on lessons:
Taking part on practical lessons is obligatory, visiting lectures is recommended.

b) Tests and other tasks

Date	Tests
7.	Test #1
13.	Test #2
14.	Repeater tests

c) Terms of signature and practice mark
Students who accomplish semester requirements get signature and practice mark.

d) Evaluation of practice mark
Practice mark is mean value of two tests results (or repeater tests) if the mark of them is at least 2. If mark of any of them after repeater tests is 1 then the practice mark is 1 as well.

e) Repeater tests
Failed tests can be rewritten on last week of the lesson period of the semester.

f) Repeater test in examination period of the semester
Failed practice mark can be improved in first two weeks (10 working days) of the examination period. The date of it is given by the reader before the end of the lesson period.

Budapest, 2014.08.15.

dr. RÁCZ, Pál
associate professor