

Óbuda University Bánki Donát Faculty of Mechanical and Safety Engineering			Institute of Materials and Manufacturing Sciences Department of Materials Technology		
Subject: Engineering Materials		BAXMNE1BNF		Credits: 4	
2026/27 I semester					
Subject leader:	Dr Tünde Kovács		Lecturer:	Varga Péter	
Prerequisite:					
Lessons per Week:	Lectures: 2	Practical lessons: 0	Laboratory lessons: 2	Consultation by request	
Evaluation:	Midterm mark				
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. The effect of deformation and recrystallization on metals. Interpretation of the equilibrium diagram and its information content. Non-equilibrium transformations of metals. Iron-carbon alloys. Non-ferrous alloys. Structure, properties and application of polymers, ceramics and composite materials.					

Lecture program	
Week of semester	Topic
1	School break
2	Introduction General overview of engineering materials
3	Mechanical properties and failure of metals Hardness, strength, deformation, toughness, fatigue, creep
4	Microstructure of materials Atomic bonding in solids The crystalline structure Imperfections in the crystalline structure
5	Microstructure of materials The effect of structure on mechanical properties Deformation, recrystallization Testing methods
6	Polymeric materials
7	1 st test
8	The structure of metallic alloys Crystallization and transformation of metallic alloys Equilibrium phase diagrams
9	Iron-carbon alloys Equilibrium structure and phase diagram Non equilibrium transformations
10	Iron-carbon alloys Steels and cast irons

11	Iron-carbon alloys Steels and cast irons Nonferrous alloys
12	School break
13	2 nd test
14	Make-up tests

2. References

J. Verebély-Dévényi, P. Rácz: Engineering materials, Óbuda University, 2012.

William D. Callister, David G. Rethwisch: Materials Science and Engineering, Wiley, 2018.

Lecture presentation slides; elearning.uni-obuda.hu

3. Requirements

a) Participation:

Visiting lectures and practical lessons is obligatory.

b) Tests and other tasks

Week of semester	Tasks
7	1 st test
13	2 nd test
14	Make-up tests

a) Terms of signature and midterm mark

Both tests (or make-up tests) should be written to gain a midterm mark. Otherwise the result is “forbaded”, which prevents students to take the repeated test in the exam period, so they fail the subject.

b) Evaluation of midterm mark

The midterm mark is the mean value of the marks of the test (or make-up tests) if none of the results are “failed” (1). If any of the marks is “failed” (1) then the midterm mark is “failed” (1) as well.

Evaluation of tests:

0-40%	failed (1)
41-55%	pass (2)
56-70%	satisfactory (3)
71-85%	good (4)
86-100%	excellent (5)

c) Repeating and improving of the results of tests and other tasks

A missed or failed test (both tests) can be rewritten on the 14th week of the semester.

d) Exams

e) Repeating in the exam period

“Failed” midterm mark can be improved in the first two weeks (10 working days) of the exam period in the form of a repeating test.

2026. 09. 04.

Péter Varga