

<b>Óbudai University</b> Bánki Donát Faculty of Mechanical and Safety Engineering		<b>Institute of Materials Science and Manufacturing</b> Engineering Institute Group of Materials and Forming Technology		
<b>Name and code of subject: Engineering Materials (Mérnöki anyagok) BAGMN1ENND</b>				
<b>Credit points: 6</b>				
<i>Full-time course, 2018/19/I</i>				
Majors, on which the subject is taught: technical manager				
Subject leader::	dr. Mucsi András		Lecturer:	dr. Mucsi András
Prerequisite:	-			
Classes per week:	Lecture: 2	Seminar: 0	Laboratory: 2	Consultancy: upon request
Evaluation (s,v,f): f	midterm mark			
<b>Course description</b>				
Aim: Basics of materials science, technology, design principles materials testing principles.				
Principles of materials science and engineering. Structure of materials: metals, polymers, ceramics and composites. Basic properties of materials: strength, ductility, toughness. Non-destructive testing of materials. Materials characterization, testing methods. Craystallographic structures. Tensile, hardness, Charpy, deformability testing methods in practice. Basics of theoretical and practical materials science, specialized for mechatronic engineers. Basics of metallic materials, structure-property relations. Iron alloys, iron carbon alloys. Crystallization, melting kinetics, Gibbs phase rule. Fatigue, low and high cycle. Static and dynamic loadings and their effects. Crack propagation theories. Principles and methods of materials selection. Application examples, design practice.				

<b>Schedule</b>	
Week	Topic
1.	Requirements for the subject. Basic material types. Basic engineering load
2.	Structure of metallic materials, crystallinity, lattice descriptions, lattice defects
3.	Properties of metallic materials, testing methods, evaluation of properties
4.	Tensile testing, theory, practice and applications
5.	Destructive and nondestructive testing methods, theory and practical applications
6.	Ductile-brittle behaviour of materials, Charpy impact tests, DBTT temperature
7.	1st midterm
8.	Fracture mechanics, fracture toughness, measurement methods, properties of different materials, leak before break design of pressure vessels
9.	Crystallization, solidifaction, Gibbs phase rule, recrystallization, solid state transformation
10.	Steels and cast irons, transformations in Fe-C alloys, steel types
11.	Basics of heat treatments of steels, Bóbulk and surface hardening methods
12.	Polymeric materials, structure, properties, basic types of ceramics
13.	2 nd midterm
14.	Retake of the midterms

## 2. References

William Callister: Materials Science and Engineering, John Wiley & Sons, Inc. 1985  
Power Point presentation from Moodle system

## 3. Requirements

**a) Presence:**  
obligatory, maximum 30% missing is allowed

### b) Midterms

Oktatási hét

**Tests**

7.

1st test

13.

2nd test

### c) Terms of signature and practice mark

The average of the midterm 1 and 2 should be at least 40%  
The result of each midterm should be minimum 20%

### d) Determination of final mark

<40% (1), 41-55% (2), 56-70% (3), 70-85% (4), 86-100% (5).

### e) Repeater tests

Repeater tests could be written on the last week of the lesson period.

### f) Repeater test in the examination period

Failed final mark can be improved in first week of the examination period. The date of it is given by the reader before the end of the lesson period.

Budapest, 2018. august 28.

dr. Mucsi András  
egyetemi adjunktus