

## COURSE SYLLABUS SEMESTER FALL 2020/2021

<b>Name of Course</b>	<b>Materials Science</b>
<b>Course Code</b>	<b>MSB021AN-EA-00</b>
<b>Allotment of Hours per Week</b>	<b>1</b>
<b>Number of Credits</b>	<b>2</b>
<b>Program</b>	<b>Civil Engineering</b>
<b>Evaluation</b>	<b>Mid-semester report, individual work</b>
<b>Semester</b>	<b>1</b>
<b>Prerequisites</b>	<b>-</b>
<b>Department</b>	<b>Department of Civil Engineering</b>
<b>Instructor</b>	<b>Dr Adél Len</b>

### OBJECTIVES

Students will gain from this course:

- Knowledge about materials chemical and physical properties
- Methods of studying materials structure
- Knowledge about various novel materials used especially in construction

### CONTENTS

#### Short description

The course provides basic knowledge about materials structure on different - macroscopic, mesoscopic, atomic - levels, destructive and non-destructive methods of studying materials. The course topics starts from the smallest entities of the material, and builds up the macroscopic objects step by step, with emphasis on the composition of construction materials. Several novel technologies and materials will also be discussed.

#### Methodology

- **Lectures:** introduce the students into the main properties, characteristics of the solid state material, and give an introduction into the structural analysis methods
- **Students task:** students will be assigned tasks to complete. These tasks consist of individual work and may have "research components" where students need to gather information in order to complete a task and present its conclusions
- **Exams:** Accumulated knowledge is tested by the completed practical tasks. A multiple-choice test will verify the gathered knowledge

## Schedule

Week 2	Course description. Orientation. Explanation of students tasks. Introduction. From quarks to atoms. Atomic structure. Periodic table. Elements. Compounds. Mixtures
Week 4	Chemical bonding. Solid, liquid and gas phases. Amorphous and crystalline structure. Real crystals, crystallographic defects
Week 6	Solid construction materials. Novel materials in construction
Week 8	<i>AUTUMN HOLIDAY</i>
Week 10	Destructive and non-destructive methods for studying the characteristics of materials
Week 12	<b>Practical work – students tasks 1. Multiple choice test</b>
Week 14	<b>Practical work – students tasks 2. Multiple choice test</b>

## ATTENDANCE AND GRADING

### Attendance

Attending (personal presence or on-line) is required in all classes. Personal presence needs to be made by taking into account the measures in the fight against COVID-19 pandemic, announced at the "<https://english.mik.pte.hu/news/information-for-students-and-colleagues-on-the-epidemiological-situation-related-to-the-spread-of-the-coronavirus>" web page of the University.

### Grading

1. a multiple-choice test needs to be completed with a minimum 50% score
2. individual work/task
  - the task consists of an English language scientific article, a Case Study, that has to be read, studied, understood, and presented in the class
  - the task involves personal work and study, it has several objectives:
    - the student has to learn how to understand a problem, presented in a scientific way
    - the student has to get used to individual research using different type of resources, such as printed bibliography or internet
    - the student has to get used to formulate his own opinion about a scientific statement
    - the student needs to learn to present and explain a topic or subject, and to answer to questions related to it
    - Power Point Presentation of 15-20 minutes: 8-10 slides, that needs to be sent to the [len.adel@mik.pte.hu](mailto:len.adel@mik.pte.hu) previously

Grading: 100 points as follows:

- 50 points: multiple-choice test
- 50 points: presentation (content, understanding of the topic, additional information, explanation of terms, methods, logic of the presentation)

### Offered exam grade

Evaluation in percent	Numeric grade
85%-100%	5
74%-84%	4
63%-73%	3
50%-62%	2
0-49%	1

### READINGS AND REFERENCE MATERIALS

William D. Callister Jr.: Material Science and Engineering, John Wiley and Sons, Inc., 2007, New York

J. W. Morris Jr.: A Survey of Materials Science, Department of Material Science and Engineering, Berkley, 2007