

COURSE SYLLABUS SEMESTER FALL 2019/2020

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

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:** will 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 1	Course description. Orientation. Students tasks
Week 2	Introduction. From quarks to atoms. Atomic structure
Week 3	Periodic table. Elements. Chemical bonding. Relation between chemical bonding and macroscopic characteristics of the materials
Week 4	Solid, liquid and gas phases. Amorphous and crystalline structure
Week 5	Real crystals, crystallographic defects
Week 6	Solid construction materials, Novel materials in construction
Week 7	Materials study (Destructive and non-destructive methods)
Week 8	<i>AUTUMN HOLIDAY</i>
Week 9	<i>Multiple-choice test</i>

Week 10	Scanning electron microscopy
Week 11	Scanning electron microscopy in practice
Week 12	Practical work – students tasks 1
Week 13	Practical work – students tasks 1
Week 14	Practical work – students tasks 1
Week 15	Practical work – students tasks 1

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 in week 9 (minimum 50% has to be reached)
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, understand the solution
 - 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 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