

### General Information:

|                                     |   |
|-------------------------------------|---|
| <b>Name of Course:</b>              | <b>ELECTRICAL PROPERTIES OF MATERIALS</b>   |
| <b>Course Code:</b>                 | MSB281ANEP  |
| <b>Semester:</b>                    | <b>1</b>  |
| <b>Number of Credits:</b>           | 4   |
| <b>Allotment of Hours per Week:</b> | 2 Lectures /Week+1 Laboratory/Week  |
| <b>Evaluation:</b>                  | Signature (with grade) and exam   |
| <b>Prerequisites:</b>               | <b>None</b>   |
| <b>Instructor:</b>                  | <b>Dr. Gergely Nyitray</b><br>Office: 7624, Pécs, Boszorkany u. 2. Office N° B342<br>E-mail: nyitray@vili.pmmf.hu |

### Introduction, General Course Description:

The aim of this course is to present the basic concepts of Material Science that students need to know for later courses and future careers. Many times, a material problem is one of selecting the right material from the many thousands that are available. There are several criteria on which the final decision is normally based.

### Learning Objectives:

Excel in careers related to the entire life cycle of materials—from synthesis and processing, through design and development, to manufacturing, performance, reclamation and recycling.

- Know the fundamental science and engineering principles relevant to materials.
- Understand the relationship between nano/microstructure, characterization, properties and processing and design of materials.
- Possess a knowledge of the significance of research, the value of continued learning and environmental/social issues surrounding materials.

### Methodology:

- **Lectures:** will give an introduction to the Material Science.
- **Homework:** -
- **Exams:** Accumulated knowledge is tested in only one exam during the semester. The feature of the exam is essay or multiple choice. In case the exam fails or the student disagree with the grade of the exam a retake exam will be organized. In case the exam succeeded the grade is recommended for the student as a final exam result.

### Schedule:

| <b>Week</b> | <b>Topic of lecture</b>                     |
|-------------|---|
| Week 1      | Classification of materials                 |
| Week 2      | History of materials                        |
| Week 3      | Atomic Structures and Inter-atomic Bondings |
| Week 4      | The periodic Table                          |
| Week 5      | Abundance and Usability of Elements         |
| Week 6      | The Structure of Crystalline Solids         |
| Week 7      | Imperfection of Solids                      |

|         |  |
|---------|--|
| Week 8  | Mechanical Properties of Metals        |
| Week 9  | <i>Break – no class</i>                |
| Week 10 | Metal Alloys                           |
| Week 11 | Applications and Processing Ceramics   |
| Week 12 | Polymer Structures                     |
| Week 13 | Corrosion and Degradation of Materials |
| Week 14 | <b>Exam</b>                            |
| Week 15 | <b>Second exam</b> (only if required). |

**Attendance:**

To be in class at the beginning time and stay until the scheduled end of the lesson is required, tardiness of more than 20 minutes will be counted as an absence. In the case of an illness or family emergency, the student must present a valid excuse, such as a doctor's note.

**Grading:**

|                         |          |         |         |         |       |
|-------------------------|----------|---------|---------|---------|-------|
| Grade:                  | 5        | 4       | 3       | 2       | 1     |
| Evaluation in percents: | 89%-100% | 77%-88% | 66%-76% | 46%-65% | 0-45% |

**Students with Special Needs:**

Students with a disability and needs to request special accommodations, please, notify the Deans Office. Proper documentation of disability will be required. All attempts to provide an equal learning environment for all will be made.

**Readings and Reference Materials:**

Gambiattista, Richardson, Richardson: "College Physics" McGraw-Hill International Edition 2007  
ISBN-13 978-0-07-110608-5

William D. Callister, Jr.: "Materials Science and Engineering, An Introduction" John Wiley & Sons, Inc. ISBN-13: 978-0-471-73696-7