#### Materials Science

Code: MK5ANTUG05GX17-EN

ECTS Credit Points: 5

Evaluation: exam

Year, Semester: 1st fall semester

Its prerequisite(s): -

Further courses are built on it: Yes/No

Number of teaching hours/week (lecture + practice): 2+3

Topics:

The aim of the course is to extend the material science knowledge taught in the undergraduate course, through the presentation of special materials and its tangible analysis. Additionally, students can get closer to medical materials, which are currently being developed at a remarkable scale.

Literature:

Compulsory:

* Chawla, Krishan K. Composite Materials Science and Engineering 3rd ed. Springer 2012
* [Nicolais, Luigi;](http://www.prospero.hu/katalogus/kereso/?form_submit=1&szerzo=Nicolais+Luigi) [Meo, Michele;](http://www.prospero.hu/katalogus/kereso/?form_submit=1&szerzo=Meo+Michele) [Milella, Eva:](http://www.prospero.hu/katalogus/kereso/?form_submit=1&szerzo=Milella+Eva) Composite Materials: A Vision for the Future, 2011 Springer Verlag
* C.P. Poole, F.J. Owens: Introduction to nanotechnology, Wiley Interscience, 2003 Schedule

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| 1st week: Registration week |  |
| 2nd week:  Lecture: Overview of the groups of substances and presentation of the latest material science results  Practice: Preparation of a metallographic sample for semester task | 3rd week:  Lecture: Composites I. - overview and presentation of composite materials  Practice: Preparation of a metallographic sample for semester task |

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| 4th week:  Lecture: Composites II. - composite manufacturing technology  Practice: Charpy impact test for semester task | 5th week:  Lecture: Composite III. - Aerospace industrial and space applications  Practice: Charpy impact test for semester task |
| 6th week:  Lecture: Composite IV. - Special composites, nano and bio composites  Practice: Charpy impact test for semester task | 7th week:  Lecture: Polymer I. - Overview of Industrial Polymers, Production Technology  Practice: Charpy impact test for semester task |
| 8th week: 1st drawing week |  |
| 9th week:  Lecture: Polymer II. - Certification procedures for industrial polymers, case studies  Practice: Charpy impact test for semester task | 10th week:  Lecture: Ceramics I. - Overview  Practice: Charpy impact test for semester task |
| 11th week:  Lecture: Ceramics II. - Production technology  Practice: Measurement of toughness and theoretical strength calculation of the ceramic coating of the neural implant. | 12th week:  Lecture: Ceramics III. - Qualification procedures  Practice: Measurement of toughness and theoretical strength calculation of the ceramic coating of the neural implant. |
| 13th week:  Lecture: Biocompatible materials I.  Practice: Microscopic analysis of human implants | 14th week:  Lecture: Biocompatible materials II.  Practice: Microscopic analysis of human implants |

15th week: 2nd drawing week

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three practice classes during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can’t take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

During the semester there are two tests: the mid-term test is on the 8th week and the end-term test is on the 15th week. Students must sit for the tests.

B, for grade:

The course ends in a mid-semester grade based on the average grade of the two tests.

The minimum requirement of the mid-term and the end-term test is 60% separately. The grade for each test is given according to the following (score/grade): 0-59 % = fail (1); 6069 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).If the score of any test is below 60, the student once can take a retake test of the whole semester material.