

Course title: Fundamental of Materials Engineering

Institute/Division: Chair of Materials Engineering, Faculty of Materials Engineering and Physics

Course code:

Erasmus subject code:

Number of contact hours: 45 hours

Course duration: 1 semester

ECTS credits: 6

Course description:

The course “Fundamental of Materials Engineering ” intended for students who do not have a materials science & engineering background. The course will cover four major topics including: fundamental concepts, microstructure development & phase equilibria, material properties and fabrication methods and applications. The course will cover atomic structure, atomic bonding, crystal structures, defects, and diffusion in materials. It also will cover phase transformations and phase equilibria and how they impact microstructure development. The electrical, magnetic, optical, thermal, and mechanical properties of materials will also be reviewed. The course will also highlight modern fabrication technologies and applications of metals, ceramics, semiconductors, and polymers

Seminar part: Student will learn the basic principles of design and materials selection. In engineering practice there are exist important criteria that must be considered in the development of a marketable product. Some of these are economic in nature and, to some degree, are unrelated to scientific principles and engineering practice, and yet are significant if a product is to be competitive in the commercial marketplace. Other criteria that should be addressed involve environmental and societal issues such as pollution, disposal, recycling, toxicity, and energy. Finally, economic, environmental, and societal considerations that are important in engineering practice.

Literature

1. Ashby, M. F. and D. R. H. Jones, *Engineering Materials 1, An Introduction to Their Properties and Applications*, 3rd edition, Butterworth- Heinemann, Woburn, UK, 2005.
2. Ashby, M. F. and D. R. H. Jones, *Engineering Materials An Introduction to Microstructures, Processing and Design*, 3rd edition, Butterworth- Heinemann, Woburn, UK, 2005.

3. Ashby, M., H. Shercliff, and D. Cebon, *Materials Engineering, Science, Processing and Design*, Butterworth-Heinemann (an imprint of Elsevier), Oxford, 2007.

Course type: lectures (30 hours), problem sessions (15 hours)

Prerequisites: basic knowledge of physics, chemistry, mathematics to develop an understanding of how structure and processing affect the properties and performance of materials.

Primary target group: Materials Science, Materials Engineering

Lecturer: Jan Kazior, Profesor

Contact person: Jan Kazior, e-mail: jkazior@pk.edu.pl

Remarks: The Lectures reserves the right to make changes to this syllabus as necessary