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| The title of the course | **Materials Science: Metallic materials** |
| Faculty | [Faculty of Mechanical Engineering and Computer Science](http://eng.ath.bielsko.pl/index.php/faculties/gerg) |
| The level of studies | Undergraduate (BA) |
| Semester | Winter/summer |
| The form of classes and number of hours | Laboratory/Project |
| Language of instruction | English |
| The number of ECTS | **2 ECTS** |
| Teacher | dr hab. inż. Dariusz Jędrzejczyk, prof. UBB |
| The aims of the course  (maximum 500 characters) | This course is intended for students who do not have a metals science and engineering experiences. The course will cover the following topics: metals testing methods (non-destructive, macro and microscopic), correlation between chemical composition, structure and expected mechanical properties of aluminium, copper and carbon alloys. The course offers a basic understanding of materials requirements of alloys for various applications and will also highlight modern fabrication technologies and applications of metals. |
| The content of the course: main topics and key ideas | Seminars/Laboratories – 50/50   1. Non-destructive – ultrasonic metals testing– 2h 2. Macroscopic investigations – defects and structure analysis – 2h 3. Metallographic sample preparation and observations – 2h 4. Etching and microscopic observations of Al and Cu alloys structures -2h 5. Correlation between microstructure and properties of carbon alloys – 2h |
| Didactics methods | Multimedia presentation, discussion - seminar  Real experiment - laboratory |
| Course requirements | Exam/presentation/attendance |
| Literature (basic and supplementary) | Basic:   1. Cardarelli F., Materials Handbook, Springer, 2nd ed., 2008 2. Krautkramer J., Krautkramer H., Ultrasonic testing of materials, Springer, 1990 3. Zhou Y., Youn L., Huang Y., Micro- and Macromechanical Properties of Materials 4. Joseph R. Davis, Cast Irons, ASM International, 1996 5. Ashby M.F., Shercliff Cebon D., Materials: engineering, science, processing and design, Butterworth-Heinemann, 2013   Supplementary:   1. Ashby M.F., Materials Selection in Mechanical Design, Butterworth-Heinemann, 2004 2. Callister D.W., Rethwisch D.G., Materials Science and Engineering: An introduction, 8th ed. Wiley, 2013 3. Callister D.W., Rethwisch D.G., Materials Science and Engineering: An integrated approach, d. Wiley, 2012 4. Krauss G., Steels: Procesing, Structure, and Performance, ASM International, 2005 5. Weng Y., Dong H., Gan Y., Advanced Steels, Springer and Metallurgical Industry Press, 2011 |
| The effects of the education   * knowledge * skills * social competences | (K) Knows the basics of macro and microscopic observations and can interpret the equilibrium diagrams of different alloys  (Sk) Is able to conduct ultrasonic tests and microscopic observations of Al, Cu and C alloys,  (So) Be aware of responsibility for own work and is ready to comply with rules of cooperation in team |