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| The title of the course | **Mechatronics** |
| Faculty | [Faculty of Mechanical Engineering and Computer Science](http://eng.ath.bielsko.pl/index.php/faculties/gerg) |
| The level of studies | Undergraduate (BA) |
| Semester | Summer |
| The form of classes and number of hours | Lectures |
| Classes conducted for Polish students. Erasmus students can join them | Yes |
| Language of instruction | English |
| The number of ECTS | 2 |
| Teacher | dr inż. Jerzy Kopeć jkopec@ath.bielsko.pl |
| The aims of the course  (maximum 500 characters) | The aim of this course is to provide basic skills and knowledge associated with mechatronics systems, and to provide basic skills in modelling and simulation of mechatronic systems. Lectures includes information of contemporary industrial and domestic systems, and methods of mechatronics systems design. The lectures introduce general method and rules for solving engineering problems of mechatronics systems |
| The content of the course: main topics and key ideas | 1. What is mechatronics, optomechatronics, structronics, etc. Mechatronics paradigm. Synergetic effects. 2. Elements of mechatronic systems. 3. Mechanical, electrical and hydraulic actuators 4. Sensors 5. Intelligent control system, microcomputers 6. Examples of mechatronics devices and systems (industrial, domestic, and social appliances). 7. MEMS and biomimetic subsystems in mechatronics 8. Modelling of mechatronics systems 9. Unified variable system 10. Short bondgraph method description. 11. Design methods of mechatronics systems. 12. Software for mechatronics system modelling and design |
| Didactics methods | Multimedia presentations, lectures |
| Course requirements | Presentation/attendance |
| Literature (basic and supplementary) | Basic :   1. System Dynamics Modeling, Simulation, and Control of Mechatronic Systems, Karnopp, Margolis, . Rosenberg, 3rd Ed, John Wiley, New York 2000 2. Mechatronics by Bond Graphs, Damić, Montgomery, Springer Verlag, Berlin Heidelberg 2003   Supplementary:   1. Mechatronika, Heimann Bodo, Gerth, Popp 2. Continuous System Modeling, Cellier, Springer Verlag 1991 |
| The effects of the education   * knowledge * skills * social competences | Knowledge:  He knows basic principles of mechatronics systems  He knows modelling methods for mechatronic systems, and its efficient application in the practice  Skills:  He can perform simulations of simple mechatronics system  Social competences:  He is able to think independently trying to solve creatively practical problems of analysis of mechatronic devices and systems |