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| The title of the course | **Dynamics of Robots** |
| 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 | Lecture |
| Classes conducted for Polish students. Erasmus students can join them | Yes |
| Language of instruction | English |
| The number of ECTS | 1 |
| Teacher | dr inż. Krzysztof Kubas |
| The aims of the course  (maximum 500 characters) | The aim of the course is to give the students the good working knowledge of dynamics analysis of robot manipulators. Lectures include informations about the two advanced methods of dynamics analysis of robot manipulators. In the both cases, the inverse dynamics problem will be solved. These methods of large practical significance are based on the different mathematical algorithms. It’s important because the same problem can be solved using the two different methods. Thus, students with the help of proposed methods can verify correctness of calculation results. The course gives the good introduction to the control theory of robots. |
| The content of the course: main topics and key ideas | 1. Spatial descriptions and transformations. Description of position and orientation. Homogenous transform  2. Denavit-Hartenberg notation. Link description. Link connection description. Affixing coordinate systems to links  3. Description of geometry of selected manipulators  4. Manipulator dynamics. Newton equations. Euler equations. Recursive Newton-Euler dynamics algorithm  5. Example of analysis of inverse dynamics problem using Newton-Euler algorithm  6. Manipulator dynamics. Lagrangian formulation of manipulator dynamics |
| Didactics methods | Lectures by using multimedia equipment |
| Course requirements | Exam |
| Literature (basic and supplementary) | Basic  1. Ceccarelli M., Fundamentals of Mechanics of  Robotic Manipulation, Kluwer Academic  Publishers, 2004  2. Craig J.J., Dynamics of Robots: Mechanics and  Control, Prentice Hall, 2004  3. Featherstone R., Robot Dynamics Algorithms,  Kluwer Academic Publishers, 1987  Supplementary  1. McKerrow P. , Introduction to Robotics  Addison-Wesley, 1991  2. Vukobratovic M., Introduction to Robotics,  Springer Verlag, 2012 |
| The effects of the education   * knowledge * skills * social competences | - knowledge  He knows basic principles of dynamics of robot manipulators and the rules of their efficient application in the practise  - skills  He is able to solve chosen problems of dynamics of robot manipulators which reflect real engineering tasks  - social competences  He is able to think independently trying to solve creatively practical problems of dynamics of robot manipulators |