|  |  |
| --- | --- |
| The title of the course | **Forecasting and Simulation in Enterprise I** |
| Faculty | [Faculty of Mechanical Engineering and Computer Science](http://eng.ath.bielsko.pl/index.php/faculties/gerg) |
| The level of studies | Postgraduate (MA)  Engineer (BSc) |
| Semester | Winter/summer |
| The form of classes and number of hours | Laboratory/Project  15h/15h |
| Classes conducted for Polish students. Erasmus students can join them | No |
| Language of instruction | English |
| The number of ECTS | **2 ECTS** |
| Teacher | dr hab. inż. Dariusz Plinta, prof. UBB |
| The aims of the course  (maximum 500 characters) | **Semester: Summer**  The main purpose of the course is to give the students an introduction to principles of production processes analysis with the usage of the modelling and simulation method.  The main part of the course will be focus on practical application of the computer systems aiding designing and analysing of production processes.  **Semester: Winter**  During the next semester, there will be realized more detailed simulation analyses (forecasting, costs, internal transport). |
| The content of the course: main topics and key ideas | **Semester: Summer**   1. Introduction - rules for realization of simulation projects, areas of usage, forecasting and simulation in practice. 2. Intuitive presentation of simulation - the run of designing activities and their labour consumption, determination of goals, modelling of processes, process control and analyze, statistical data preparation, verification and validation, simulation experiments, evaluation and presentation of results. 3. Software for modelling and simulation - simulation package ARENA. 4. Planning and conducting of simulation experiments - quantity of variants, sequence of simulations and simulation time. 5. Preparation of data for simulation – value stream mapping, finding improvements 6. Simulation of the logistics system – simulation model creating, experiments, results, conclusions.   **Semester: Summer**   1. The use of computer simulation in forecasting -evaluation and interpretation of simulation results. 2. Detailed simulation analyses – production costs, internal transport. 3. New approaches in simulation - methodology of realization simulation projects, quick modelling techniques and expert systems in simulation. 4. Summary of the course area. |
| Didactics methods | Seminar and project |
| Course requirements | Presentation and seminar paper |
| Literature (basic and supplementary) | Basic   1. GREGOR M., HALUŠKOVA M., HROMADA J., KOŠTURIAK J., MATUSZEK J.: Simulation of Manufacturing System. Politechnika Łódzka Filia w Bielsku-Białej, Bielsko-Biała 1998. 2. MATUSZEK J., KOŠTURIAK J., GREGOR M., CHAL J., KRIŠŤAK J.: Lean Company. Akademia Techniczno-Humanistyczna, Bielsko-Biała 2003. 3. ROTHER M., SHOOK J.: Learning to See. Lean Enterprise Institute, Inc., Brookline, Massachusetts 2003. 4. SADOWSKI R. P.: Simulation with ARENA. McGraw-Hill, New York 2003. 5. Online Books for ARENA software – included in the software.   Supplementary:   1. GREGOR M., MEDVECKÝ Š., MIČIETA B., MATUSZEK J., HRČEKOVÁ A.: Digital Factory. KRUPA print, Zilina 2007. 2. HARRIS R., HARRIS C., WILSON E.: Making material flow. Lean Enterprise Institute, Inc., Cambridge 2003. 3. PLINTA D.: Modelling and simulation of the production processes in the conditions of the group working of machine elements. (Doctor’s thesis), University of Zilina, 2002. 4. ROTHER M., HARRIS R.: Creating Continuous Flow. Lean Enterprise Institute, Inc., Cambridge 2001. 5. VOLLMAN T.E., BERRY W.L., WHYBARK D.C.: Manufacturing Planning and Control Systems. Down Jones-Irwin 1998. |
| The effects of the education   * knowledge * skills * social competences | Knowledge:   * about the basic criteria for evaluation of the manufacturing enterprises functioning, * tools for forecasting and simulation of production processes.   Skills:   * to evaluate the impact of changes in the manufacturing process on the selected parameters of production systems functioning with the use of simulation tools, * to design and improve manufacturing systems.   Social competences:   * can work independently and in a team. |