

POLITEHNICA University of Bucharest (**UPB**)  
 Faculty of Industrial Engineering and Robotics (**IIR**)  
 Study Programme: Industrial Engineering (**IE**)  
 Form of study: Master

## COURSE SPECIFICATION

<b>Course title:</b>	Factory Simulation	<b>Semester:</b>	3
<b>Course code:</b>	UPB.06.M3.O.01	<b>Credits (ECTS):</b>	5

<b>Course structure</b>	Lecture	Seminar	Laboratory	Project	Total hours
<i>Number of hours per week</i>	2	-	2	-	4
<i>Number of hours per semester</i>	28	-	28	-	56

<b>Lecturer</b>	Lecture	Seminar / Laboratory / Project
<i>Name, academic degree</i>	Miron ZAPCIU, Professor	Iuliana BOTEANU, PhD
<i>Contact (email, location)</i>	miron.zapciu@upb.ro	iuliana_boteanu@yahoo.com

<b>Course description:</b>
<p><i>Factory structure and design and integrated manufacturing; business structure, production, computer-aided engineering, management of production.</i></p> <p><i>Definition of flexible manufacturing systems and the component structure</i></p> <p><i>Computer Integrated Manufacturing system (CIM-Festo example); structure, flexibility, control and programming levels</i></p> <p><i>The general architecture of the transport systems as part of flexible manufacturing systems</i></p> <p><i>Automated Storage and Retrieval Systems</i></p> <p><i>Transport Automation using Automated Guided Vehicles. Determining the size of a transport system into a Flexible Manufacturing System. Case Study - a module of CIM Festo system Set-up and initial conditions to start-up of industrial robots included in Manufacturing Systems</i></p> <p><i>Programming a "pick-and-place" cycle for the Mitsubishi robot</i></p> <p><i>Scheduling manufacturing systems for flow level - LUCAS software</i></p> <p><i>Quality Inspection of a product in Flexible Manufacturing Systems</i></p> <p><i>Integrated automation – TIA Portal concept</i></p> <p><i>Scheduling of flows in Integrated Manufacturing Systems</i></p>
<b>Seminar / Laboratory / Project description:</b>

*Conducting an interactive lab sessions for identification and structural representation of the various automated manufacturing systems architectures. Obtaining the structure and characterization of the CIM-FESTO production system based on cost, productivity and flexibility. Programming of specific work stations with Machine Tool - CNC equipment. Simulation of production at workstations - Sinumerik 840D application. Scheduling manufacturing systems for flow level - LUCAS software. Determination of automated transport tasks in the system CIM-Festo*

*- obtaining the efficiency of the transportation system determination of automated transport tasks in the system CIM-Festo - obtaining the efficiency of the transportation system.*

***Intended learning outcomes:***

*The course objective is to acquire the necessary technical knowledge of product design simulation taking into account the integrated manufacturing framework based on computers. Particular attention is given to modules CAD / CAM and programming of industrial robots and machine tool integrated in Flexible Manufacturing Systems.*

*Learning outcomes are consisting in developing the capacity to design and simulation of complex industrial processes and systems using modular solutions.*

<b><i>Assessment method:</i></b>	<b><i>% of the final grade</i></b>	<b><i>Minimal requirements for award of credits</i></b>
Written exam	40%	
Report / project	15%	
Homework	-	
Laboratory	30%	
Other	15%	

***References:***

- [1] Ispas C., Maşala I., Zapciu M., Mohora C., Hasler Fl., Coteş C. - CIM - Computer Integrated Manufacturing. Îndrumar de instruire. Editura BREN, Bucureşti, 1997, ISBN 973-9493-21-1
- [2] Zapciu M., Paraschiv M.D. – Elemente de bază ale programării maşinilor-unelte cu comandă numerică. Editura Academiei Oamenilor de Ştiinţă din România, 2015. ISBN 978606-8636-12-2.
- [3] Ispas, C, Zapciu, M., Mohora, C. Maşini-Unelte. Concepţie Integrată, Editura Agir, Bucureşti, 2007, ISBN 978-973-720-173-7.
- [4] Rehg, J., Kraebber H. – Computer-Integrated Manufacturing. Second Edition, 2001, Prentice-Hall, Inc. New Jersey, USA. ISBN: 0-13-087553-8.
- [5] \*\*\*, <http://www.journals.elsevier.com/robotics-and-computer-integrated-manufacturing/>

***Prerequisites:***

***Co-requisites***

*(courses to be taken in parallel as a condition for enrolment):*

<b><i>Additional relevant information:</i></b>	
Graduation is conditional upon attending all laboratory works.	

Date: 04 May 2017

Professor Miron ZAPCIU