POLITEHNICA University of Bucharest (**UPB**)
Faculty of Engineering and Management of Technological Systems (**IMST**)
Study Programme: Industrial Engineering (**IE**)
Form of study: Master

COURSE SPECIFICATION

Course title:	Industry 4.0	***Semester:***	II
Course code:	UPB.06.M2.O.03	***Credits (ECTS):***	7

Course structure	Lecture	Seminar	Laboratory	Project	Total hours
Number of hours per week	2		2	2	6
Number of hours per semester	28		28	28	84

Lecturer	Lecture	Seminar / Laboratory / Project
Name, academic degree	Bogdan ABAZA, Assoc. Prof.	Bogdan ABAZA, Assoc. Prof.
Contact (email, location)	Bogdan.abaza@imst.pub.ro CB204	Bogdan.abaza@imst.pub.ro CB204

Course description:

Industry 4.0 mixes the real world of production with the virtual world of informationand communication technology. Based on this, traditional industrial processes are supplemented and optimised by the digital world.

Preparing the next generation of engineers is close related with preparing it for the next generation of industry. This course introduces students in the industry where we can find new ways in which people, machines and data caninteract.

This course has these objectives:

- Advanced knowledge regarding design principles, hardware and software components used in Industry 4.0.
- Developing the capacity to configure, programming and use Internet of Things systems;
- Developing the capacity to process and analyse experimental data;

Seminar / Laboratory / Project description:

During the laboratory activities students will learn how to work with:

- Internet of Things examples
- Electrical measurements of Internet of Things
- Data acquisition programming for Internet of Things

Intended learning outcomes:

- Advanced knowledge regarding design principles, hardware and software components used in Industry 4.0
- Undertanding programming and use Internet of Things systems.

- Process and analyse experimental data

Assessment method:	% of the final grade	Minimal requirements for award of credits
Written exam	40%	20%
Report / project	20%	10%
Homework	20%	
Laboratory	20%	10%
Other		

References:

[1] Bungart, S., 2014: Industrial Internet versus Industrie 4.0. Produktion – Technik und Wirtschaftfür die deutsche Industrie
[2] Davis, J.F., Wetzel, J, Graybill, R, , Smart Manufacturing, Real-time Networked Information Workflows and Enterprise Performance, Sustainable Chemical Product and Process Engineering Conference, 2013, Dalian China
[3] Chand, S. and J.F. Davis, The smart manufacturing revolution, Manufacturing Executive Leadership Journal, 2010, November.
[4] J. Höller, V. Tsiatsis, C. Mulligan, S. Karnouskos, S. Avesand, D. Boyle: From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence. Elsevier, 2014, ISBN 978-0-12-407684-6.
[5] Jerome, J.; Virtual Instrumentation Using LabVIEW; PHI Learning; 2010; ISBN 978-81-203-4030-5
[6] Kutz, M.; Handbook of Measurement in Science and Engineering; John Wiley & Sons; 2013; ISBN 978-0-470-40477-5
[7] [Gubbi, Jayavardhana; Buyya, Rajkumar; Marusic, Slaven; Palaniswami, Marimuthu (24 February 2013). Internet of Things (IoT): A vision, architectural elements, and future directions, Future Generation Computer Systems 29 (7): 1645–1660.

Prerequisites:	***Co-requisites*** ***(courses to be taken in parallel as a condition for enrolment):***
Graduated licensing (Bachelor) - Industrial Engineering, Engineering and Management, Mechanical Engineering , Mechatronics and Robotics and other similar domains	

Additional relevant information:

Date:
Professional degree, Surname, Name: Assoc. Prof., ABAZA Bogdan