Óbuda University Donát Bánki Faculty of Mechanical and Safety Engineering	Institute of Mechatronics and Vehicle Engineering Department of Mechatronics

Subject name and Neptun-code:
***Basics of Mechatronics* II (BGRME2ANND)** **Credit points of the Subject: 4**
Full time training. Spring Semester of the Academic year of 2017/2018.

Course available at: Mechanical Engineering training				
Supervised by:	Dr. Attila Bencsik	Lectured by:	Prof. Dr. Róbert Szabolcsi	
Requirements of the course: (Neptun Codes)	Basics of Mechatronics I (BGBE13NND)			
Lessons per week:	Theory: 1	Practice (in Auditorium):	Lab: 2	Consultation: on demand
Level of exam:	Practice mark (**p**)			

The Syllabus

Aim: to give an overview about digital techniques applied in mechatronics, and basics of robot techniques.

Schedule

Weeks	
1.	Registration week.
2.	Introduction to the subject. Syllabus overview. Requirements of the course. Analog and digital signals. Digital circuits and binary numbers.
3.	Combinational logic. Minimization of the logic functions. Boolean Algebra. Karnaugh Maps.
4.	Combinational Logic Applications. Algebraic operations. Binary codes.
5.	Encoders. Decoders. Multiplexer. Demultiplexer.
6.	Counters. Registers. Sequential circuits.
7.	1st Test.
8.	Robot applications. Service robots. Logistical robots. Air robots. Ground robots. Underwater robots. Water surface robots.
9.	Industrial robots. Welding robots. Painting robots. Robot applications in food industry. Robot applications in precision agriculture.
10.	Coordinate-systems.Robot arm mechanisms. Equations of motions.
11.	Drives applied in industrial robots.
12.	Control strategies applied in robot arm control.
13.	Control strategies applied in robot navigation control.
14.	2nd Test.
15.	Gaining signature and practice mark. Test paper writing activity, improvement.

Requirements

All main three areas of the course are evaluated by test papers. The course is successfully executed if and only if all the two test papers are evaluated with grade higher than Grade2 (‘Satisfactory’). If a single test is failed and Grade 1 (‘Unsatisfactory’) is provided for, and it is not improved, the signature must be denied. If any of the two tests is the not written one the student must be cancelled from the course.

To improve: If the test paper is evaluated with Grade1 ‘Unsatisfactory’, the student must be provided 2 occasions to improve. The 15th lecture is also among those of available for improving.

Participation: The participation is not obligatory at all lectures with the exception of the test paper lectures.

Practice mark (p): Average of the grades provided for the two test papers.

References
1. Paul, C.R., Nasar, S.A., Unnewher, L.E.: Introduction to Electrical Engineering. McGraw-Hill International Editions, 1992. 2. Schilling, C., Belove, C.,: Electronic Circuits – Discrete and integrated. McGraw-Hill International Editions, 1989. 3. Morris, N.M.: Electrical Circuits – Analysis and Design. The Macmillan Press Ltd., 1993. 4. Bolton, W.: Electrical and Electronic Measurement and Testing. Longman Scientific & Technical, 1992. 5. Beards, P.H.: Analog and Digital Electronics. Prentice-Hall International Ltd., 1991. 6. Lecture notes of the students.
Quality Assurance: using feedback provided by the students for improving content and methods of teaching of the subject. Besides, or, instead of the traditional lecture delivering and conducting labs, on the students' demand, a project-based learning (PBL) teaching method can be implemented.

2 February 2018, Budapest, Hungary.

Prof. Dr. Róbert SZABOLCSI
lecturer