

Óbuda University Bánki Donát Faculty of Mechanical and Safety Engineering		Insitute of Mechatronics and Vehicle Engineering	
Subject title and code: Sensors and Actuators, BMXSAE5BNF		Credits: 5	
Full-time study 3 ac. 5 semester year			
The course is available at: mechatronical engineering			
Supervised by: dr. István Nagy		Instructors: dr. Nagy István, dr. Nagy András,	
Prerequisite (neptun code):			
Weekly number of lessons			
Lecture: 3	Group seminar: 2	Lab:	Consultation: see,
Way of assessment: Exam (Written and oral)			
Online consultation (in case it's required): ... (BBB link)			
Educational goal:	Getting to know the basic sensors and actuators used in industrial automation. Basically, sensors and actuators used in industry are already covered in other subjects, and we will ignore them (within the framework of this subject). Such are devices used in hydraulics/pneumatics, and devices used in mobile robots. What the subject focuses on (in general) is the structure, division, errors, characteristics, and their analysis of sensors and actuators. An overview of the physical phenomena necessary to understand the operation. What we will cover a little more specifically are inductive, capacitive, optical, and principle-operated sensors. What we plan to do in the future are sensors and actuators used in micro (possibly nano) mechatronics, e.g.: sensors and actuators operating on the piezo principle. The exercises this year are limited in terms of measurements (due to the lack of a laboratory).		
Schedule			
Education week	Topics		
1.	Lecture: basic physical phenomena related to sensors that are not conventionally used in the world of physics Practice:		
2.	Lecture: Classification of sensors and actuators based on various aspects Practice:		
3.	Lecture: basic definitions related to sensors and actuators: characteristics, accuracy (absolute/relative), standard deviation, transfer and transition functions, internal structure of sensors/actuators Practice:		
4.	Lecture: temperature sensors, force and mechanical stress sensors (strain gauges, piezo and magnetoelastic sensors in this regard) Practice:		
5.	Lecture: Different applications of inductive and capacitive sensors. Flow sensors (rotary, pressure-based, US, magnetic induction-based, calorimeter, Vortex flowmeter) Practice		
6.	Lecture: Strain gauges and temperature sensors, Practice:		
7.	Lecture: Temperature sensors and flow sensors, Practice:		
8.	Lecture: Introduction and divisions. Practice:		
9.	Lecture: Electrical actuators, special motors, Practice:		
10.	Lecture: Actuators – stepper motors, Practice:		
11.	Rect.-s Holiday		
12.	Lecture: micro actuators – piezo and ultrasonic motors Practice:		
13.	Final TP		

14.	Backlog replacements, TP, Retakes				
Mid-semester requirements					
Test		Assignment to be submitted		Lab measurement	
amount	dates	amount	deadlines	amount	dates
1	see schedule	2	see, moodle		on practices
According to the Study and Examination regulations of Óbuda University attendance of group seminars and lab exercises are mandatory.					
Other requirements for participation in sessions not covered by the regulations and restrictions on substitutions:					
Test		Assignment to be submitted		Lab measurement	
maximum points available	minimum score required to pass /test	maximum points available	minimum score required to pass / assignment	maximum points available	minimum score required to pass /lab
100/TPpoints	50%points	100/assignm.points	60%points	...points	...points

Total number of points achievable in semester: ...points				
Grading thresholds	satisfactory 50 % and above	average 65 % and above	good 75 % and above	excellent 90 % and above
Other evaluation criteria: During the semester, on practices, the students can write assessed short papers, calculations. There are is possible to get RECOMMENDED MARK, if: the total Sum% >64%; other limits: 65-75=3; 76-89=4; 90- :=5;				
Receive a signature denied entry: over limited absence, not submitted assignments,				
Required references: see, moodle				
Recommended references: see, moodle				
Quality assurance methods of the subject:				

Things, that are not included, can be found within the regulations of Óbuda University.