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

Subject title and code: *Adaptive Control Systems (BMXASE3MNE)*	**Credits:** *4*
Full-time study 2023/24 *ac.* I. *semester year*	

The course is available at: mechatronical engineering

Supervised by: Judit Dr. LUKÁCS	**Instructors:** Judit Dr. LUKÁCS

Prerequisite (neptun code):

Weekly number of lessons			
Lecture: 2	Group seminar: 0	Lab: 1	Consultation: opt.

Way of assessment: Midterm mark   (Written and oral)

Online consultation (in case it's required):   *... (BBB link)*

Educational goal:	*Aim:* General characteristics of adaptive systems. Hierarchical systems. Feedforward and feedback structures. Fuzzy-neuro-genetic hybrid decision support and expert systems. Non-conventional solutions.

Schedule	
Education week	**Topics**
1.	Adaptive control, self-organising fuzzy control systems.
2.	Sliding mode fuzzy control, hierarchical control.
3.	Fuzzy model inversion.
4.	Control systems based on neural networks.
5.	Advanced feedforward networks, feedback networks.
6.	Fuzzy-neuro systems, neuro-fuzzy control system.
7.	Fuzzy-genetic system, genetic-fuzzy system.
8.	Neuro-genetic system.
9.	Fuzzy-neuro decision support system.
10.	Fuzzy expert system.
11.	Hybrid hierarchical robot control system.
12.	Non-conventional solutions.
13.	Summary, Test
14.	Test retake

Mid-semester requirements

Test		Assignment to be submitted		Lab measurement	
amount	dates	amount	deadlines	amount	dates
1	Week 13				

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
100points	51points	…points	…points	…points	…points

Total number of points achievable in semester: 100points

Grading thresholds	satisfactory 51 % and above	average 70 % and above	good 80 % and above	excellent 90 % and above

Other evaluation criteria: All main areas of the course are evaluated by test papers. The course is to be considered successfully executed if and only if test result reaches a level of 51%.	
Receive a signature denied entry:	**During the semester**, the midterm requirements can be **replaced** in the following cases: test failed; illness. In the case of an unsuccessful final examination, a replacement is possible within the first 10 working days of the examination period, within the framework of a fee-based Signature Replacement Examination.
Required references:	Lecture notes
Recommended references:	*Stefanovic, M.J., Safonov, M.G.,* Safe Adaptive Control: Data –Driven Stability Analysis and Robust Synthesis, Springer Verlag London, 2011 *Wang, C., Hill, D.J.*, Deterministic Learning Theory for Identification, Recognition and Control, CRC Press, 2010 *Lakhmi C. Jain, Clarence W. de Silva*, Intelligent Adaptive Control: Industrial Application, CRC Press, 1998
Quality assurance methods of the subject:	

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