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

Subject title and code: **BMKTNFDBLF, Fuzzy Decision-Making and Applications** **Credits:** *0*

Full-time study 2025/2026 *ac.* 2 *semester year*

The course is available at: mechatronical engineering

Supervised by: Prof. Dr. Ludányi-Laufer Edit	**Instructors:** Felisberto David Wandi Chivela

Prerequisite (neptun code): -

Weekly number of lessons

Lecture: 0	Group seminar: 2	Lab: 0	Consultation:

Way of assessment: Midterm mark (Written and oral)

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

Edu. goal: Fuzzy set theory is an approach used to solve problems that cannot be solved by classical set theory or probability theory. This course's primary objective is to teach students the fundamental concepts of fuzzy set theory and fuzzy logic used in engineering applications.

Schedule

Education week	**Topics**
1.	Introduction to Soft computing methods. Fuzzy logic. Neural networks. Genetic algorithms. Conventional set theory. Introduction to Fuzzy sets. Membership functions. Operation on fuzzy sets, fuzzy intersection (t-norm), fuzzy union (t-conorm)
2.	Aggregation operators. Implication and inference. Defuzzification methods. Mamdani type inference system. Matlab Fuzzy Logic Designer.
3.	Sugeno type inference systems. Neuro-fuzzy systems. ANFIS. Hierarchical systems.
4.	Fuzzy systems in decision making. Fuzzy multi-criteria decision making. Fuzzy Cognitive Maps. Test.
5.	
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14.	

Mid-semester requirements

Test		Assignment to be submitted		Szöveg beírásához kattintson vagy koppintson ide.	
amount	dates	amount	deadlines	amount	dates
1	session 4	1	session 4		

According to the HKR 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		Szöveg beírásához kattintson vagy koppintson ide.	
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
60points	24points	40points	20points	…points	…points

Total number of points achievable in semester: …points				
Grading thresholds	**satisfactory** 40 % and above	**average** 55 % and above	**good** 70 % and above	**excellent** 85 % and above
Other evaluation criteria: During the semester, in accordance with the schedule above, a student can make up the theory midterm if they have a valid official absence note (from a doctor or from a coach), or it was unsuccessful.				
Receive a signature denied entry:	The signature will be denied to that student who misses the midterm and has no absence note to justify their non-attendance, or fails to submit the project assignment or misses more classes than it is allowed by HKR.			
Required references:	Moodle course			
Recommended references:	J.ROSS, Timothy. Fuzzy Logic With Engineering Application, 2010. Sivanandam, S. N., Sai Sumathi, and S. N. Deepa. Introduction to fuzzy logic using MATLAB. Vol. 1. Berlin: Springer, 2007. C. Mathworks, Adaptive Fuzzy Inference System Toolbox, Mathworks 2020. Chakraverty, Snehashish, Deepti Moyi Sahoo, and Nisha Rani Mahato. Concepts of soft computing: fuzzy and ANN with programming. Springer Singapore, 2019.			
Quality assurance methods of the subject:				

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