ECE 449 (Fall 2019) **Midterm Study Guide**

Topic	Concepts	Notes	Karray	Toshinori	Comment
Intelligent systems	characteristics, taxonomy, application areas	3-8	3-14, 38-45, 50-51		
Fuzzy systems	characteristics, application areas	9-10	57-64	121-123	
Fuzzy sets (FS)	definition, representation, membership functions, operations on FS, comparison of FS, representation theorem	11-22	65-90	123-130	Not included: pair-wise comparison, equality index
Fuzzy relations (FR)	definition, representation, operations on FR , composition of FR (including special cases)	23-31	97-125	130-138	Not included: fuzzy arithmetic
Fuzzy rule-based computing	inference, modus ponens, linguistic variables, accumulation and usage of knowledge, implication operators, fuzzy algorithm	36-42	82-83, 126-127, 35-37	138-143	
Fuzzy control	structure of fuzzy controller (FLC), fuzzification, defuzzification, numerical characteristics of FLC, Mamdani and Sugeno FLC	43-52	137-156	143-152	
Properties of FLC	completeness, continuity, consistency, FLC architectures	53-56	180-182, 164-169	N/A	
Neural networks (NN) concepts	information processing, massive parallelism, plasticity, biological and artificial neuron, activation function	57-59	226-228, 230	7-8	
NN architectures	Network structure, interconnection variations, weights	60-62	226-227	9-11, 37-38	Not included: NN history
Single neuron structures	McCulloch-Pitts, Perceptron	65-69	233-244	N/A	

Karray, F. O., DeSilva, C., Soft computing and intelligent systems design: theory, tools, and applications, Pearson/Addison Wesley, 2004

Toshinori, M., Fundamentals of the new artificial intelligence: neural, evolutionary, fuzzy and more, Springer, 2008 (available electronically from the UofA library)

Note: It will be helpful to review problems in assignments #1-5 and in-class exercises #1-7