



**University/Academy:** Arab Academy for Science and Technology & Maritime Transport  
**Faculty/Institute:** College of Computing and Information Technology  
**Program:** B.sc. in Computer Science

<b>Course title</b>	Soft Computing
<b>Course code</b>	<b>CS464</b>

### Form no. (11A) Knowledge and skills matrix for a course

Course content	Week study	Knowledge	Intellectual skills	Professional skills	General skills
Introduction to Optimization	1	<ul style="list-style-type: none"> <li>Know the difference between soft computing and hard computing</li> </ul>		<ul style="list-style-type: none"> <li></li> </ul>	Use Soft computing-related terminology
Genetic Algorithms(1)	2	<ul style="list-style-type: none"> <li>Know the standard genetic algorithm procedure,</li> <li>Know different operators of genetic algorithm</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Use Genetic Algorithm to solve simple optimization problem</li> </ul>	
Genetic Algorithms(2)	3	<ul style="list-style-type: none"> <li>Identify different problem encoding</li> </ul>	<ul style="list-style-type: none"> <li>Analyze efficiency and limitations of problem encoding</li> </ul>	<ul style="list-style-type: none"> <li>Use Genetic Algorithm Matlab tool Box</li> </ul>	
Genetic Programming and Evolutionary Strategies	4	<ul style="list-style-type: none"> <li>Know the standard genetic programming procedure,</li> <li>Know the standard evolutionary strategies procedure,</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Use Genetic Programming Matlab tool Box</li> </ul>	
Introduction to Artificial Neural Networks	5	<ul style="list-style-type: none"> <li>Understand Threshold logic unit</li> <li>Know perceptron model</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>use perceptron to adjust weights</li> </ul>	Understand the principle of biological neural networks

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Applications of ANN	6	<ul style="list-style-type: none"> <li>• know the creation of arrays</li> <li>• explain how to apply ANN for classification</li> <li>• explain how to apply ANN for regression</li> </ul>	•	•	
7 <sup>th</sup> week Exam	7	•	•	•	
Neural Network Learning	8	<ul style="list-style-type: none"> <li>• Understand Back Propagation</li> </ul>	•	<ul style="list-style-type: none"> <li>• Apply Back propagation to adjust weights of ANN</li> <li>• Use NN tool box</li> </ul>	
Introduction to Fuzzy logic	9	<ul style="list-style-type: none"> <li>• Explain fuzzy thinking</li> <li>• Understand fuzzy rules</li> </ul>	•		Understand how humans take fuzzy decisions
Fuzzy Rules	10	<ul style="list-style-type: none"> <li>• Explain fuzzy rules</li> <li>• Understand linguistic variables and hedges</li> <li>•</li> </ul>	•	<ul style="list-style-type: none"> <li>• Solve problems on fuzzy sets operations</li> </ul>	
fuzzy inference	11	<ul style="list-style-type: none"> <li>• Understand fuzzy inference</li> </ul> <p><b>Understand Mamdani-style Inference</b></p>	•	<ul style="list-style-type: none"> <li>• Apply Mamdani-style Inference</li> </ul>	
12 <sup>h</sup> week Exam	12	•	•	•	
Particle Swarm Optimization	13	<ul style="list-style-type: none"> <li>• Understand the PSO procedure</li> </ul>	<ul style="list-style-type: none"> <li>• Analyze the role of PSO tuning parameters</li> </ul>	<ul style="list-style-type: none"> <li>• Apply PSO for parameters tuning</li> </ul>	
Support vector machine	14	<ul style="list-style-type: none"> <li>• Understand the SVM procedure</li> <li>• Understand the role of kernels</li> </ul>	•	•	

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Comparison of soft computing approaches	15	<ul style="list-style-type: none"> <li>Understand the advantages and disadvantages of different soft computing approaches</li> </ul>	<ul style="list-style-type: none"> <li>Analyze complexity of soft computing approaches</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	

**Course Instructor**

Name:

Signature:

**Head of Department**

Name:

Signature: