

## Course Description Form

1. Course Name:
Neural Network
2. Course Code:
WBM-52-05
3. Semester / Year:
2 <sup>nd</sup> Semester / 2026
4. Description Preparation Date:
20/1/2026
5. Available Attendance Forms:
Weekly (Theoretical)
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hours / 2 credit
7. Course administrator's name (mention all, if more than one name)
Asst. Lec. Ali Abdulhusein Mohammed <a href="mailto:ali.masaoodi@uowa.edu.iq">ali.masaoodi@uowa.edu.iq</a>
8. Course Objectives
The Neural Networks course aims to enable the student to acquire skills like: <ol style="list-style-type: none"><li>1. Build a computational system capable of simulating the human brain in problem solving.</li><li>2. Enable the student to automatically organize and classify textual data.</li><li>3. Extract meaningful information from complex and imprecise data.</li><li>4. Perform medical diagnosis through classification of medical images or signals.</li><li>5. Understand most engineering applications of neural networks and how to properly apply and utilize them in biomedical engineering.</li></ol>
9. Teaching and Learning Strategies
<ul style="list-style-type: none"><li>• The instructor delivers detailed theoretical lectures.</li><li>• The instructor assigns periodic reports on the core topics of the course.</li><li>• The instructor ensures coverage of the fundamental concepts of neural networks, their types, and practical applications to strengthen the learning and teaching process.</li><li>• The instructor introduces students to the main applications of neural networks in the theoretical and practical design of various medical devices.</li></ul>

10. Course Structure					
Week	Hours	Unit or subject name and required learning outcomes	Topic Name	Learning method	Evaluation method
1	2	Comparison between biological and artificial neurons, Compare the structure and function of biological neurons and artificial neurons	Comparison between biological and artificial neurons	Lectures presented in PDF format	Daily quizzes homework monthly exams
2-3	4	Artificial neural system models, Overview of feedforward neural networks with examples	Artificial neural system models	Lectures presented in PDF format	Daily quizzes + homework + monthly exams
4-5	4	Neural processing, learning, and adaptation, Explain neural processing mechanisms, learning methods, and adaptation techniques	Neural processing, learning, and adaptation	Lectures presented in PDF format	Daily quizzes + homework + monthly exams
6	2	Data preprocessing, Steps including feature scaling, normalization, feature selection, and optimization	Data preprocessing	Lectures presented in PDF format	Daily quizzes + homework + monthly exams
7-8	4	Performance evaluation, Techniques such as validation sets, training/testing splits, and cross-validation	Performance evaluation	Lectures presented in PDF format	Daily quizzes + homework + monthly exams
9-12	8	Explanation and applications of KNN, Linear Discriminant Analysis (LDA), and Support Vector Machines (SVM)	Classifiers	Lectures presented in PDF format	Daily quizzes + homework + monthly exams
13-14	4	Learning rules, Overview of Hebbian, Perceptron, Delta, Winner-Take-All, Correlation, and	Learning rules	Lectures presented in PDF format	Daily quizzes + homework + monthly exams

		Out-star learning rules			
15	2	Medical signals, Overview of different types of medical signals and the challenges related to their processing	Medical signals	Lectures presented in PDF format	Daily quizzes + homework + monthly exams
<b>11. Course Evaluation</b>					
<ol style="list-style-type: none"> <li>1. Daily exams consisting of practical and theoretical questions.</li> <li>2. Participation marks awarded for challenging competitive questions among students.</li> <li>3. Periodic course exams in addition to the midterm exam and the final exam.</li> </ol>					
<b>12. Learning and Teaching Resources</b>					
Textbooks		Neural networks and learning machines, third edition, Simon Haykin Neural networks theory, Alexander I. Galushkin			
Main References		Scientific websites and online academic resources for following the latest developments in the subject.			
Supporting Books and Recommended References		Reputable scientific journals related to artificial intelligence.			