Course Description Form

1. Course Name
Neural networks
2. Course Code
WBM-52-05
3. Semester / Year
Quarterly
4. Date of preparation of this description
20/1/2025
5. Available attendance formats
Weekly (theoretical)
6. Number of Credit Hours (Total) / Total Number of Units
30 hours theoretical / 2 units
7. Course administrator name
Name: Dr. Saad Mahmoud Sarhan Email: saad.mah@uowa.edu.iq
8. Course Objectives

The subject of neural networks aims to acquire the following skills: 1. Creating a computing system that has the ability to simulate the human brain in solving problems. 2. The student should be able to organize and classify written data automatically. 3. Extract meaning from complex and inaccurate data. 4. Medical diagnosis by classifying medical images or signals. Know most of the engineering applications of the above vocabulary and how to benefit from them and employ them correctly in the field of biomedical engineering	**Course Objectives:**

9. Teaching and Learning Strategies
✓ The teacher gives detailed theoretical lectures ✓ The teacher requests periodic reports on the basic topics of the subject. ✓ The teacher is familiar with the basic concepts of neural networks of all kinds and practical applications, which enhances the method of learning and teaching. The teacher introduces students to the most important main applications of neural networks in the design of various medical devices theoretically and practically.

10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
Daily tests + homework + monthly tests	Lectures presented in PDF format	Comparison of biological and artificial neurons	Comparison of the structure and functioning of biological neurons and artificial neurons	2	1
Daily tests + homework + monthly tests	Lectures presented in PDF format	Models of artificial neural systems	Overview of front grilles with examples	4	2-3
Daily tests + homework + monthly tests	Lectures presented in PDF format	Neuroprocessing, learning and adaptation	Explain neural processing mechanisms, learning methods, and coping techniques	4	4.5
Daily tests + homework + monthly tests	Lectures presented in PDF format	Data processing	Steps that include feature scale, normalization, feature selection, and optimization	2	6
Daily tests + homework + monthly tests	Lectures presented in PDF format	Performance measurement	Techniques such as the use of verification kits, training and testing, and cross-checking	4	7.8
Daily tests + homework + monthly tests	Lectures presented in PDF format	Workbooks	Explain and apply near-neighbor algorithms (KNN), linear differential analysis (LDA), and supporting vector machines (SVM)	8	9-12
Daily tests + homework + monthly tests	Lectures presented in PDF format	Learning rules	Overview of learning rules such as Hebbian, Perceptron, Delta, Winner, Correlation, and Out-star rule	4	13-14

Daily tests + homework + monthly tests	Lectures presented in PDF format	Medical Signals	Overview of the different types of medical signals and the challenges associated with their treatment	2	15

11. Course Evaluation

1- Daily exams with practical and scientific questions.

2- Participation scores for challenging competition questions among students.

3- Semester exams for the curriculum in addition to the mid-year exam and the final exam.

12. Learning and teaching resources

Neural networks and learning machines, third edition, Simon Haykin Neural networks theory, Alexander I. Galushkin	Required textbooks
• College library for additional curriculum resources. • View scientific websites to see the latest developments in the subject	Main references
All sober scientific journals related to artificial intelligence	Recommended books and references