**Course Description Form**

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| 1. Course Name: | | | | | | | | |
| Neural Networks | | | | | | | | |
| 1. Course Code: | | | | | | | | |
| WBM-52-07 | | | | | | | | |
| 1. Semester / Year: | | | | | | | | |
| Semester | | | | | | | | |
| 1. Description Preparation Date: | | | | | | | | |
| 2024-03-19 | | | | | | | | |
| 1. Available Attendance Forms: | | | | | | | | |
| presence in the classroom | | | | | | | | |
| 1. Number of Credit Hours (Total) / Number of Units (Total) | | | | | | | | |
| 30 Hours / 2 Units | | | | | | | | |
| 1. Course administrator's name (mention all, if more than one name) | | | | | | | | |
| Name: Saad M. Sarhan  Email: saad.mah@uowa.edu.iq | | | | | | | | |
| 1. Course Objectives | | | | | | | | |
| **Course Objectives** | | | | A neural network is a method in artificial intelligence that teaches computers to process data in a way that is inspired by the human brain. This course provides general introduction, fundamental concepts of artificial neural system, types of learning systems, training and testing applications, and application of neural network system in medicine. | | | | |
| 1. Teaching and Learning Strategies | | | | | | | | |
| **Strategy** | | The goal of the neural network approach was to create  a computational system that could solve problems like a human brain.  Neural networks have supported diverse tasks, including computer  vision, speech recognition, machine translation, social network  filtering, playing board and video games, and medical diagnosis. | | | | | | |
| 1. Course Structure | | | | | | | | |
| **Week** | **Hours** | | **Required Learning Outcomes** | | **Unit or subject name** | | **Learning method** | **Evaluation method** |
| 1 +2+3 | 4 | | Introduction | | Introduction to the biological neural networks and neurons, comparative between biological and artificial neuron | | Lectures presented in PDF format | Daily exams + homework assignments + monthly exams |
| 4+5+6 | 4 | | artificial neural system | | Fundamental concepts of artificial neural system, models of artificial neural system, feed forward network, examples, | | Lectures presented in PDF format | Daily exams + homework assignments + monthly exams |
| 6+7 | 4 | | Feedback network | | Feedback network, examples, neural processing, learning and adaptation, | | Lectures presented in PDF format | Daily exams + homework assignments + monthly exams |
| 8+9 | 4 | | Input data | | Input: Data preprocessing, Feature scaling and Normalization, Feature Selection, Optimization, | | Lectures presented in PDF format | Daily exams + homework assignments + monthly exams |
| 10 +11 | 4 | | Output data | | Output: Measuring performance, Using a validation set, Training and Testing, Cross validation | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 12 | 4 | | Learning Methods | | Supervised and unsupervised learning, KNN, LDA, and SVM Classifiers | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 13 | 4 | | Learning Rules | | Neural network learning rule, Hebbian, perceptron, delta, winner, correlation, out star learning rules | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 14 | 4 | | Types of networks | | Types of network, single layer network, multilayer network, advantage of neural network, limitations of neural network | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 15 | 4 | | Training of networks | | Training of neural network , back propagation training, application | | Lectures presented in PDF format | Daily exams + homework assignments + monthly |
| 1. Course Evaluation | | | | | | | | |
|  Daily exams with practical and scientific questions. ‏   Participation scores for difficult competition questions among students   Establishing grades for environmental duties and the reports assigned to them   Semester exams for the curriculum, in addition to the mid-year exam and final exam | | | | | | | | |
| 1. Learning and Teaching Resources | | | | | | | | |
| Required textbooks (curricular books, if any) | | | | | | Neural networks and learning machines, third edition, Simon Haykin  Neural networks theory, Alexander I. Galushkin | | |
| Main references (sources) | | | | | | • College library to obtain additional sources for the academic curricula  • Check scientific websites to see recent developments in the subject | | |
| Recommended books and references (scientific journals, reports...) | | | | | | All reputable scientific journals that are related to the broad concept of neural networks | | |