Course Description Form

1. Course Name:
Deep Learning
2. Course Code:
M.Sc.
3. Semester / Year:
Second / MSc
4. Description Preparation Date:
20/12/2025
5. Available Attendance Forms:
In the class
6. Number of Credit Hours (Total) / Number of Units (Total)
45 hours / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Ban N. Dhannoon Email: ban.n.dhannoon@nahrainuniv.edu.iq
8. Course Objectives

Course Objectives	• **This course discusses the latest deep learning models that researchers are currently using. Different deep architectures and their components are discussed in detail.** • **It also discusses algorithms used to train deep architectures to improve deep models. These deep architectures are not only capable of learning complex tasks but can even outperform humans in some custom applications.**

9. Teaching and Learning Strategies

Strategy	**Provide lectures in PowerPoint slide show** **Execute selected methods for more understanding**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	• Shallow Learning • Why to Use Deep Learning • How Deep Learning Works		Powerpoint	
2	3	• Convolutional Neural Network (ConvNet/CNN) Convolution Operation			

3	3	• Architecture of CNN.			
4	3	• Training Convolution Neural Networks Loss Functions and Softmax Classifier			
5	3	• Gradient Descent-Based Optimization Techniques Challenges in Training Deep Networks			
6	3	Mid 1			
7	3	• Weight Initialization Techniques			
8	3	• LeNet-5 • AlexNet			
9	3	• ZFNet • VGGNet			
10	3	• GoogleNet • ResNet			
11	3	• (DenseNet) • Capsule Network			
12		• Restricted Boltzmann Machine (RBM)			
13		Mid 2			
14	3	• Deep Belief Network Deep Autoencoders			
15	3	Generative Adversarial Networks			

11. Course Evaluation

Final Exam 70
Mid1 Exam 10
Mid2 Exam 10
Two monthly projects 10

12. Learning and Teaching Resources

Required textbooks (curricular books, if any	• Advances in Deep Learning, 2020
Main references (sources)	• Dive in Deep Learning 2019
Recommended books and references (scientific journals, reports…)	• The Little Book of Deep Learning, François Fleuret, 2023
Electronic References, Websites	• Youtube