Course Name	Machine Learning for Computer Vision		التعلم الآلي لنظم الرؤية بالحاسب	
Course Information	Course Code	Course No.	Credit Hour	Prerequisite(s)
	0911-1669	669	3 (3-0-6)	**Foundations of CV**
Course Track	☐ Program Core		☒ Electives	

Course Description. Computer Vision has become ubiquitous in our society, with applications in search, image understanding, apps, mapping, medicine, drones, and self-driving cars. Core to many of these applications are visual recognition, which is the process of automatically extracting valuable information from visual data (images and videos). This includes knowing what objects are in a picture, where they are, what's happening, and where it is happening. Given the nature of the problem and the abundance of data available today, visual recognition is typically formulated as a machine learning problem. In this course students study the problems of instance-level object recognition, category-level object recognition, action recognition, pose estimation, detection, and segmentation. The course will cover a wide range of supervised, semi-supervised, and unsupervised models (consisting of fully-, partially-, and un-labeled data), as well as transferable models in object and activity recognition (learning from one dataset or task and applying to a different one). The state-of-the-art models and algorithms related to these tasks will also be discussed and implemented.

Course Outcomes. After the completion of this course, the student will be able to:

1. **Describe** and **compare** different visual recognition tasks. **[A]**
2. **Formulate** visual recognition tasks as machine learning problems and identifying appropriate solutions. **[C]**
3. **Apply** the state-of-the-art machine learning algorithms to solve visual recognition problems. **[D]**
4. **Analyze** and **evaluate** machine learning models intended to accomplish visual recognition tasks. **[B, E]**

Assessment Policy (PC)	Assignments	15%	Quiz	---	Capstone Project	40 %
	Midterm	15%	Final	30%		
Textbook	1. E. R. Davies, "Computer Vision: Principles, Algorithms, Applications, Learning", 5th Edition, Academic Press, 2017, ISBN-13: 978-0128092842. 2. M. Arif Wani, Farooq Bhat, Saduf Afzal, Asif, "Advances in Deep Learning (Studies in Big Data)", Springer, 2020. ISBN-13: 978-9811367960.					
References	1. Xiaoyue Jiang, Abdenour Hadid, Yanwei Pang, Eric Granger, Xiaoyi Feng, "Deep Learning in Object Detection and Recognition", 1st Edition, Springer, 2019. ISBN-13: 978-9811051517. 2. Ivan Vasilev, "Python Deep Learning: Exploring deep learning techniques and neural network architectures with PyTorch, Keras, and TensorFlow", 2nd Edition, Packt Publishing, 2019. ISBN-13: 978-1789348460.					