IE 590: Deep Learning in Machine Vision*  
FALL 2019 SEMESTER  
* Current title is “Robotics and Machine Vision” but will be updated in the next few weeks

INSTRUCTOR: Juan P. Wachs 49-67380  jpwachs@purdue.edu  
CLASSES: Tuesdays and Thursdays 3:00pm – 4:15pm Gris Hall 118

PREREQUISITE:  
Linear Algebra, Probability, Proficiency in Programming (Python).

OFFICE HOURS: Mondays 3:00-4:00 PM, GRIS 262A

RESOURCES:
- Deep Learning; by Book by Aaron C. Courville, Ian Goodfellow, and Yoshua Bengio. MIT Press

WHAT WILL YOU LEARN:  
Fundamental understanding of the principles guiding Convolutional Neural Networks for Visual Recognition Specifically, we will look at how data science principles are applied to computer vision through: (1) teaching neural networks including deep configurations with recent advances such as Generative Adversarial Networks (GANs), Long short-term memory (LSTMs), Style Transfer, and Autoencoders. (2) offering a highly practical and hands-on oriented and code based in the cloud platform; (3) enabling best performance and independent of local computing platform. This allows virtually anyone to experience the benefits of real-time big-data analysis as is applied to usable vision systems. Much of the background and materials of this course will be drawn from Stanford’s cs231: CNNS for Visual Recognition.

PROGRAM OVERVIEW (in a nutshell):
1. Introduction to computer vision and deep learning.
2. Linear Classification, Loss Functions, Neural Networks and Backpropagation
3. CNNs and Recurrent Neural Networks.
4. Feature Representation and Adversarial Networks.
5. Deep Reinforcement Learning
6. Style Transfer, GANs, RNNs, LSTM and Network Visualization

COURSE ASSIGNMENTS: Assignments, Midterm, and Course Project.