1.	Title of the course	Deep Learning for Computer Vision
2.	Course number	EE555L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To EE5103/2
6.	To be offered by	Department of Electrical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	**Course Objective(s):** Student will understand the concepts, theory and computational algorithms needed for several advanced real world recognition and understanding of tasks such as text, speech, characters, objects etc. Simulate and understand how machine will have power to accomplish these tasks and can aim at developing several exciting examples based learning tasks in several domains ranging from medical, economical, engineering to state of the art industrial needs.	
10.	**Course Content:** Introduction to real world signals – text, speech, image, and video. Signal processing for feature extraction: for Text (BoW), Speech (LPC), Images (SIFT, Wavelet, HoG, BoVW, FV), Videos (BoVW). Review of Pattern recognition: Generative models (GMMs); Discriminative models (Support vector Machines and Neural Networks (NNs)); ICA, HMMs, SOMs. Deep learning methods: Training in Deep Feed forward NNs. Convolutional NNs, Training CNNs. Standard architectures. Applications of Deep Nets in computer vision: Image segmentation, object recognition, Transformation invariant recognitions. Introduction to GANs (Generative adversarial networks). Visual Tracking with Deep trained nets. Transfer learning. Restricted Boltzmann machine / Bayesian Belief Nets; Applications in semisupervised classification. Deep Recurrent NNs, Applications in machine translation, Image captioning & scene understanding.	
11.	**Textbook(s):** 1. Gonzalez R C and Woods R E, *Digital image processing*, Pearson Education (2001). 2. Goodfellow I, Courville A and Bengio Y, *Deep Learning*, MIT Press (2016).	
12.	**Reference(s):** 1. Duda R O, Hart P E and Stork D G, *Pattern classification*, John Wiley and Sons (2001).	