

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Deep Learning	Course No	CSE5XXX			
Specialization	CSE/ECE/MEC/PHY/MAT	Structure (LTPC)	3	0/1	0	3/4
To be offered for	UG / DD / PG	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>	
Faculty Proposing the course	Dr. J. Umarani Jayaraman	Type	New <input checked="" type="checkbox"/>		Modification <input type="checkbox"/>	
Date of DAC	16/01/2020	Members Present in DAC	All Dept. Members			
		External Member:	Prof. Mitesh Khapra, IITM, Dept. of CSE			
Pre-requisite	CoT	Submitted for approval	41 st Senate			
Learning Objectives	Introduce major deep learning algorithms, the problem settings and their applications to solve real world problems.					
Learning Outcomes	<ul style="list-style-type: none"> • Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains • Implement deep learning algorithms and solve real-world problems • To know the cutting-edge research in this field. 					
Contents of the course (With approximate break-up of hours)	<p>Week 1: Introduction (Recap) to Neural Network, Gradient Descent, Linear Classifiers, Week 2: Linear Machines with Hinge Loss, Multilayer Perceptron, Back Propagation Learning Week 3: Optimization Techniques, , Batch Optimization Week 4: Unsupervised Learning with Deep Network, Autoencoders Week 5: Convolutional Neural Network, Building blocks of CNN, Transfer Learning Week 6: Revisiting Gradient Descent, Momentum Optimizer, RMSProp, Adam Week 7: Effective training in Deep Net- early stopping, Dropout, Batch Normalization, Instance Normalization, Group Normalization Week 8: Recent Trends in Deep Learning Architectures, Residual Network, Skip Connection Network and Fully Connected CNN etc. Week 9: Classical Supervised Tasks with Deep Learning, Image Denoising, Semantic segmentation and Object Detection etc. Week 10: RNN, LSTM Networks Week 11: Generative Modeling with DL, Variational Autoencoder, Generative Adversarial Network Week 12: Applications of Deep Learning to Computer Vision and Medical Image Processing and NLP</p>					
Text Books	<ol style="list-style-type: none"> 1. Goodfellow, I., Bengio, Y., and Courville, A., Deep Learning, MIT Press, 2016. 2. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006. 					
References	<ol style="list-style-type: none"> 1. François Chollet, Deep Learning with Python, 1st Edition, Manning Publications, 2018 2. http://www.deeplearningbook.org/lecture_slides.html 3. http://www.cse.iitm.ac.in/~miteshk/CS7015.html 					