

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD310
Course Title:	Deep Learning
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
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Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. explain the need of deep learning approaches over machine learning
2. model the appropriate deep learning algorithm for a specific problem
3. apply deep learning algorithms for solving real-world problems
4. evaluate the deep learning algorithms for different types of learning tasks in various domains

Syllabus:

Total Teaching hours: 45

Unit	Syllabus	Teaching hours
Unit-I	Artificial Neural Networks: Perceptron Learning, Feed Forward Neural Networks, Back-propagation, Unstable Gradient Problem, Limitations of Feed Forward Neural Networks for Computer Vision Problems	06
Unit-II	Convolutional Neural Networks: Details Convolution & Pooling, Dropout, Batch Normalization, State-of-the-art CNNs	08
Unit-III	Transfer Learning & Domain Adaptation: Transfer Learning Scenarios, Applications of Transfer Learning, Transfer Learning Methods, Fine Tuning and Data Augmentation, Supervised, Semi Supervised and Unsupervised Deep Learning	05
Unit-IV	Convolutional Neural Networks for Computer Vision: Image Classification, Image Classification with Localization, Semantic Segmentation, Object Detection	08
Unit-V	Sequence Models: Recurrent Neural Networks (RNN), Language Modelling, Long-Short Term Memory Network, Gated Recurrent Unit, Bi-directional RNN, Deep RNN, Applications of Sequence Models	09
Unit-VI	Miscellaneous: Auto encoders and Stacked Auto encoders, Generative Adversarial Networks, Deep Reinforcement Learning	09

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Suggested Readings/
References:

1. Ian Goodfellow, YoshuaBengio, Aaron Courville, Deep Learning, MIT Press
2. Charu C. Aggarwal, Neural Networks and Deep Learning – A Textbook, Springer
3. Adam Gibson, Josh Patterson, Deep Learning, O'Reilly Media, Inc.
4. Duda, R.O., Hart, P.E., and Stork, D.G., Pattern Classification, Wiley.
5. Theodoridis, S. and Koutrouk9mbas, K., Pattern Recognition. Academic Press
6. Russell, S. and Norvig, N. Artificial Intelligence: A Modern Approach. Prentice Hall Series in Artificial Intelligence
7. Bishop, C. M. Neural Networks for Pattern Recognition. Oxford University Press.
8. Hastie, T., Tibshirani, R. and Friedman, J. The Elements of Statistical Learning, Springer
9. Koller, D. and Friedman, N. Probabilistic Graphical Models. MIT Press
10. Richard Szeliski, Computer Vision: Algorithms and Applications, Springer

Suggested List of Experiments: -NA-
Suggested Case List: -NA-