

## Applications of Deep Learning

(HONORS)

<b>Course Code</b>	20IT6701A	<b>Year</b>	IV	<b>Semester</b>	I
<b>Course Category</b>	HONORS	<b>Branch</b>	IT	<b>Course Type</b>	Theory
<b>Credits</b>	4	<b>L-T-P</b>	4-0-0	<b>Prerequisites</b>	-
<b>Continuous Internal Evaluation :</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

<b>Course Outcomes</b>		<b>Blooms Taxonomy Level</b>
<b>Upon successful completion of the course, the student will be able to</b>		
<b>CO1</b>	Understand the fundamental techniques and principles of deep learning.	<b>L2</b>
<b>CO2</b>	Apply concepts and major architectures of deep networks to build solutions for variety of problems.	<b>L3</b>
<b>CO3</b>	Apply Deep learning techniques to build applications in various domains.	<b>L3</b>
<b>CO4</b>	Analyze CNN techniques to classify images and detect objects and prepare an effective report.	<b>L4</b>

<b>Contribution of Course Outcomes towards the achievement of Program Outcomes &amp; Strength of correlations (H: High, M: Medium, L: Low)</b>														
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>	<b>PSO1</b>	<b>PSO2</b>
<b>CO1</b>	3	3	3									3	3	3
<b>CO2</b>	3	3	3				2					3	3	3
<b>CO3</b>	3	3	2				3					3	3	3
<b>CO4</b>	3	3	3									2	3	3

<b>Syllabus</b>		
<b>Unit No</b>	<b>Contents</b>	<b>Mapped COs</b>
<b>I</b>	<b>A Review of Machine Learning</b> –The Learning Machines, How Can Machines Learn? Biological Inspiration, What Is Deep Learning? <b>Fundamentals of Deep Networks</b> – Defining Deep Learning, What Is Deep Learning? Common Architectural Principles of Deep Networks: Parameters, Layers, Activation Functions, Loss Functions, Hyper parameters.	<b>CO1,CO2</b>
<b>II</b>	<b>Building Blocks of Deep Networks</b> –RBMs, Auto encoders, Variation Auto encoders. <b>Major Architectures of Deep Networks:</b> Unsupervised pre trained networks, Deep Belief Networks , Generative Adversarial Networks.	<b>CO1,CO2</b>
<b>III</b>	<b>Convolution Neural Networks (CNNs)</b> – The Convolution Operation, Motivation, Pooling, Convolution and Pooling as an Infinitely Strong Prior, Variants of the Basic Convolution Function, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features	<b>CO1, CO4</b>
<b>IV</b>	<b>Sequence Modeling</b> – Recurrent and Recursive Nets – Unfolding Computational Graphs, Recurrent Neural Networks, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, The Long Short-Term Memory	<b>CO1, CO3</b>
<b>V</b>	<b>Deep Learning applications</b> – Computer Vision, Speech Recognition, Natural Language Processing, Other Applications.	<b>CO1, CO3</b>

<b>Learning Resources</b>
<b>Text books</b>
<ol style="list-style-type: none"> <li>1. Deep learning: A practitioner's approach, JoshPattersonandAdamGibson,FirstEdition,2017,O'ReillyMedia.</li> <li>2. Deep Learning, Iam Good fellow, Yoshua Bengio, AaronCourville, 2016,MITPress.</li> </ol>
<b>References</b>
<ol style="list-style-type: none"> <li>1. FundamentalsofDeepLearning,Designingnext-generationmachineintelligencealgorithms,NikhilBuduma, O'Reilly,</li> <li>2. DeeplearningCookBook,PracticalrecipestogetstartedQuickly,DouweOsinga,O'Reilly, 2019, Shroff Publishers.</li> </ol>
<b>e-Resources and other Digital Material</b>
<ol style="list-style-type: none"> <li>1. <a href="https://www.deeplearningbook.org/">https://www.deeplearningbook.org/</a></li> <li>2. <a href="https://onlinecourses.nptel.ac.in/noc20_cs62/preview">https://onlinecourses.nptel.ac.in/noc20_cs62/preview</a></li> <li>3. <a href="https://www.udemy.com/share/101X6W/">https://www.udemy.com/share/101X6W/</a> (or) <a href="https://www.udemy.com/course/deep-learning-advanced-nlp/">https://www.udemy.com/course/deep-learning-advanced-nlp/</a></li> <li>4. <a href="https://www.youtube.com/watch?v=5tvmMX8r_OM&amp;list=PLtBw6njQRU-rwp57C0oIVt26ZgjG9NI">https://www.youtube.com/watch?v=5tvmMX8r_OM&amp;list=PLtBw6njQRU-rwp57C0oIVt26ZgjG9NI</a></li> </ol>