

DEPARTMENT OF COMPUTER SCIENCE & DESIGN

COURSE MODULE OF THE SUBJECT TAUGHT FOR THE SESSION

2026-27 - (ODD SEM)

Course Syllabi with CO's

Faculty Name: Mrs. Harshitha M K			Academic Year: 2026 - 2027				
Department: Computer Science & Design							
Course Code	Course Title	Core / Elective	Prerequisite	Contact Hours			Total Hrs/
				L	T	P	Sessions
BCS714A	Deep Learning	Core	Basic computer fundamentals, Familiarity with MS-Office applications.	3	0	0	40 T
Course Objectives	1. Understand the basic concepts of deep learning. 2. Know the basic working model of Convolutional Neural Networks and RNN in decision making. 3. Illustrate the strength and weaknesses of many popular deep learning approaches. 4. Introduce major deep learning algorithms, the problem settings, and their applications to solve real world problems.						
Topics Covered as per Syllabus							
Module-1 Introducing Deep Learning: Biological and Machine Vision: Biological Vision, Machine Vision:The Neocognitron, LeNet-5, The Traditional Machine Learning Approach, ImageNet and theILSVRC, AlexNet, TensorFlow Playground. Human and Machine Language: Deep Learning forNatural Language Processing: Deep Learning Networks Learn Representations AutomaticallyNatural Language Processing, A Brief History of Deep Learning for NLP, ComputationalRepresentations of Language: One-Hot Representations of Words, Word Vectors, Word-VectorArithmetic, word2viz, Localist Versus Distributed Representations, Elements of Natural Human Language.							
Module-2 Regularization for Deep Learning: Parameter Norm Penalties, Norm Penalties as ConstrainedOptimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness,Semi- Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing,Sparse Representations, Optimization for Training Deep Models: How Learning Differs from Pure Optimization, Basic Algorithms. Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates.							

DEPARTMENT OF COMPUTER SCIENCE & DESIGN

Module-3

Convolution neural networks: 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, Convolutional Networks and the History of Deep Learning.

Module-4

Sequence Modelling: Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks. Long short-term memory.

Module-5

Interactive Applications of Deep Learning: Natural Language Processing: Preprocessing Natural Language Data: Tokenization, Converting All Characters to Lowercase, Removing Stop Words and Punctuation, Stemming, Handling n -grams, Preprocessing the Full Corpus, Creating Word Embeddings with word2vec: The Essential Theory Behind word2vec, Evaluating Word Vectors, Running word2vec, Plotting Word Vectors, The Area under the ROC Curve: The Confusion Matrix, Calculating the ROC AUC Metric, Natural Language Classification with Familiar Networks: Loading the IMDb Film Reviews, Examining the IMDb Data, Standardizing the Length of the Reviews, Dense Network, Convolutional Networks, Networks Designed for Sequential Data: Recurrent Neural Networks, Long Short-Term Memory Units, Bidirectional LSTMs, Stacked Recurrent Models, Seq2seq and Attention, Transfer Learning in NLP.

List of Textbooks

- Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016.
https://www.deeplearningbook.org/lecture_slides.html
- John Krohn, Grant Beyleveld, Aglae Bassens, Deep Learning Illustrated, A Visual, Interactive Guide to Artificial Intelligence, Pearson, 2022.

Course Outcomes

1. Interpret the concepts of neural networks learning processes.
2. Illustrate deep learning methods using regularization and Optimization process.
3. Design deep learning models using convolutional operations.
4. Analyze sequential data to build recurrent and recursive models.
5. Demonstrate the different interactive applications of deep learning.

DEPARTMENT OF COMPUTER SCIENCE & DESIGN

Internal Assessment Marks:

- The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
- The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks).
- A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code:	BCS714A	TITLE: Deep Learning							Faculty Name:	Mrs. Harshitha M K				
List of Course Outcomes	Program Outcomes												Total	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO-1	3	3	3	-	-	-	-	-	-	-	-	-	9	
CO-2	3	2	2	-	-	-	-	-	-	-	-	-	7	
CO-3	3	2	2	2	-	-	-	-	-	-	-	-	9	
CO-4	3	3	2	2	-	-	-	-	-	-	-	-	10	
CO-5	2	2	-	-	-	-	-	-	-	-	-	-	4	
Total	14	12	9	4	-	-	-	-	-	-	-	-	39	

Note: 3 = Strong Contribution, 2 = Average Contribution, 1 = Weak Contribution, - = No Contribution

DEPARTMENT OF COMPUTER SCIENCE & DESIGN

The Correlation of Course Outcomes (CO's) and Program Specific Outcomes (PSO's)

Subject Code:	BCS714A	TITLE: Deep Learning	Faculty Name:	Mrs. Harshitha M K
List of Course Outcomes	Program Specific Outcomes		Total	
	PSO-1	PSO-2		
CO-1	-	2	2	
CO-2	-	2	2	
CO-3	-	2	2	
CO-4	-	2	2	
CO-5	-	2	2	
Total	-	10	10	