PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+'by the NAAC

Offered to: M.C.A

22CA4E5: DEEP LEARNING

Course Descriptive and Purpose: This course is intended to facilitate students' comprehension of several key aspects of deep learning. It covers introduction of Deep Learning and focuses on the practical implementations of Artificial Neural Networks, Tensor Flow and Keras, CNN and RNN.

Course Objectives: The course help the students to understand Basics of Deep Learning, CNN and RNN Neural Networks in Tensor Flow, Applications of Deep Learning.

Course Outcomes:
On successful completion of this course, the students able to:
CO1: DefineDeep Learning,Input Output Layers in Neural Networksand Artificial Neural Networks.
CO2: Demonstrate Feed Forward, Back Propagation, Data Representation for Neural Networks.
CO3: BuildModelsusing Tensor Flow and Keras, Artificial Neural Networks, Convolution Neural Networks
CO4: Inspect Loss Functions, Optimizers, Architecture of CNN, LSTM and GRU Layers
CO5: Explain Updating Weights and Biases, Classification and Localization and Recurrent Neural Networks

CO-PO MATRIX							
COURSE CODE	**CO-PO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
	CO1	H				H	
	CO2	H		H			
	CO3	H				H	
	CO4	M		M			
	CO5	M		M			

UNIT-I (12 Hours)

Introduction to Deep Learning: Deep Learning Vs Machine Learning, Inspiration of Neural Networksfrom Brain, The Perceptron:The Simple Idea Behind Neural Networks, Artificial Neuron and its Architecture, Input and Output Layers in Neural Networks, Activation Functions, Loss Functions, Optimizers, Data Representation for Neural Networks, The Gears of Neural Networks.

UNIT-II (12 Hours)

Artificial Neural Networks: Architecture, Input and Output Layers in Neural Networks, Activation Functions, Loss Functions, Optimizers, Training a Neural Net. Feed Forward Mechanism, Back Propagation in Neural Networks, Gradient Descent Algorithm, Updating Weights and Biases, Vanishing/Exploding Gradients Problems, Reusing Pre Trained Layers, Faster Optimizers.

UNIT-III (12 Hours)

Introduction to Tensorflow and Keras: Building ANN with Keras, Problems of Vanishing Gradient and Exploding Gradient, Modifications to Neural Networks, Regularization, Normalization, Dropouts. Hand Digit Recognition in Keras, Regression with Neural Networks, Classification with Neural Networks, Building Image Classifier Using Sequential API, Building Regression MLP using Sequential API, Building Complex Models using Sequential API, Building Dynamic Models using Sequential API, Virtulizing using Tensor Board.

UNIT-IV (12 Hours)

Convolution Neural Networks (CNN): Meaning of Convolution. Architecture of CNN. Filters, Padding, Data Preprocessing in CNN, Alexnet, Googlenet, LeNet-5,VGGNet, ResNet, Xception, SENet, Image Classification with CNN using Keras, Transfer Leaning in CNN, Using Pre Trained Models from Keras, Pre Trained Models for Transfer Learning, Classification and Localization.

UNIT-V (12 Hours)

Recurrent Neural Networks (RNN): A Recurrent layer in Keras, Understanding the LSTM and GRU Layers, A LSTM example in Keras, A Temperature Forecasting Problem, Preparing The Data, First Recurrent Baseline, Using Recurrent Dropout to Fight Over Fitting, Stacking Recurrent layers, Using Bidirectional RNN's.

Prescribed Text Book			
	Author	Title	Publisher
1	François Chollet	Deep Learning with Python	Second Edition Paperback- Manning,2017
2	AurelienGeron	Hands-On Machine Learning with Scikit-Learn, Keras and Tensor Flow: Concepts, Tools and Techniques to Build Intelligent Systems	O'Reilly, 2nd Edition, 2019

Reference Text Book			
	Author	Title	Publisher
1	Peter Bruce	Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python	O'Reilly

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M.C.A **Semester: IV**

Course Code: 22CA4E5 Course Name: Deep Learning

Time: 3 Hours **MaxMarks: 70**

SECTION-A

Answer the following questions. (5×4=20Marks)

1. (a) What are the differences between Deep Leaning and Machine Learning? (CO1,L1)
(or)
(b) Write short notes idea behind Neural Networks. (CO1,L1)
2. (a) What are input and output layers? (CO1,L1)
(or)
(b) What is Loss Function? (CO4,L1)
3. (a) What is Vanishing Gradient? (CO4,L1)
(or)
(b) What are modifications to Neural Networks?(CO3,L1)
4. (a) State and explain Convolution. (CO3,L1)
(or)
(b) What is padding? (CO3,L1)
5. (a) What is Recurrent Layer? (CO5,L1)
(or)
(b) How Preparing Data is to be done? (CO5,L1)

SECTION-B

Answer the following questions. **(5×10=50Marks)**

6. (a) Explain Artificial Neuron and its Architecture. (CO1,L2)
(or)
(b) Explain Data Representation for Neural Networks.(CO2,L2)
7. (a) Explain Gradient Descent Algorithm. (CO4,L2)
(or)
(b) Illustrate Faster Optimizers. (CO4,L2)
8. (a) Explain Building Image Classifier using Sequential API. (CO3, L3)
(or)
(b) Explain Back propagation in Neural Networks. (CO2,L3)
9. (a) Explain Image Classification with CNN using KERAS (CO3, L2)
(or)
(b) Explain the need of Classification and Localization. (CO5, L2)
10. (a) Discuss Temperature Forecasting Problem.(CO5,L6)
(or)
(b) Discuss using Recurrent Dropout to Fight Over Fitting. (CO5,L6)