

University of Arkansas – Fort Smith
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General Syllabus

CSCE 41433 Deep Learning

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 0

Prerequisite: CSCE 31103 Artificial Intelligence or CSCE 43303 Machine Learning

Effective Catalog: 2020-2021

I. Course Information

A. Catalog Description

The course covers deep neural networks and their applications to the fields of artificial intelligence, natural language processing, machine learning, and computer graphics and vision

II. Student Learning Outcomes

A. Subject Matter

Upon successful completion of this course, the student will be able to:

1. Explain key concepts of neural network models.
2. Explain the applications of deep neural networks.
3. Build, design, and implement applications using deep neural networks.
4. Optimize and improve neural network models through hyper-parameter tuning.
5. Apply deep neural networks to classification problems.
6. Explain concepts of overfitting and regularization.

B. University Learning Outcomes

This course enhances student abilities in the following areas:

Analytical Skills

Critical Thinking Skills

Students will identify a problem, break it down into its components and design a solution.

III. Major Course Topics

- A.** Neural Networks
- B.** Perceptron
- C.** Back Propagation
- D.** Convergence
- E.** Gradient Descent
- F.** Overfitting and Regularization
- G.** Performance and Evaluation
- H.** Convolutional Neural Networks (CNN)
- I.** Recurrent Neural Networks (RNN)
- J.** Long Short-Term Memory (LSTM)
- K.** Generative Adversarial Networks (GAN)
- L.** Reinforcement Learning