# Deep Learning (CSE 495/595)

**Course Description:** Deep learning is a sub-field of machine learning that emphasizes learning hierarchical features representations using large amounts of data to achieve increasing levels of abstraction for classification, clustering, and regression tasks. A major advantage of deep learning is self-discovery of features as opposed to hand-crafting of features used in traditional learning systems. Deep learning has been in news lately due to its excellent performance in computer vision and natural language and speech processing tasks.

The course will begin by introducing foundational knowledge for computer vision, natural language processing, supervised and unsupervised learning. Following this, neural network learning will be covered leading to deep learning techniques such as autoencoders, convolutional neural networks, and deep belief networks.

The course will be run with instructor's lectures, students' presentations of current research papers and projects.

Prerequisites: Background in linear algebra, some exposure to machine learning/data mining (preferred but not required), familiarity with MATLAB or Python.

**Learning Objectives:**

1. Develop a good understanding of deep learning
2. Gain an understanding of different deep learning architectures
3. Become familiar with at least one deep learning library
4. Gain an insight into training of deep learning models and choice of different parameters

**Grading:**

- Projects and assignments 60%
- Presentations 20%
- Quiz 20%