CS 4277: Deep Learning

3 Credit Hours

Prerequisite: CS 3642

Concurrent: CS 4267

This course covers the foundations of Deep Learning; how to build neural networks and how to design successful deep learning projects. The course topics include convolutional networks, sequence modeling such as recurrent and recursive neural networks (RNNs), long short-term memory (LSTM), Adam, Dropout, BatchNorm, Xavier/He initialization, state-of-the-art technologies, and research topics leveraging Deep Learning. The course includes programming assignments in Python and in TensorFlow.

CS 4305: Software Engineering

3 Credit Hours

Prerequisite: CS 3410, CSE 3801, COMM 1100

This course provides an overview of the software engineering discipline with emphasis on the development life cycle and UML modeling. It introduces students to the fundamental principles and processes of software engineering, including Unified, Personal, and Team process models. This course highlights the need for an engineering approach to software with understanding of the activities performed at each stage in the development cycle. Topics include software process models, requirements analysis and modeling; design concepts and design modeling; architectural design and styles; implementation; and testing strategies and techniques. The course presents software development processes at the various degrees of granularity.

CS 4306: Algorithm Analysis

3 Credit Hours

Prerequisite: CS 3305

Algorithm analysis using formal and mathematical techniques and fundamental algorithm design strategies are studied. Topics include asymptotic analyses of complexity bounds using big-O, little-o, omega, and theta notations. The algorithmic strategies (brute-force, greedy, divide-and-conquer, recursive backtracking, dynamic programming, branch-and-bound, heuristics, and reduction) are covered. Also included are standard graph and tree algorithms. Additional topics include standard complexity classes, time-and-space tradeoffs in algorithms, and analyzing both recursive algorithms and non-recursive (iterative) algorithms.