

## Course Topics

### EEE 598: Introduction to Complex Networks

**Prerequisites:** Linear algebra, elementary ordinary differential equations, elementary scientific computing

**Catalog Course Description:** The course will present a comprehensive treatment of the basic theory and applications of modern network science and engineering, with a special emphasis on complex networks. The purpose is to provide students with the necessary background and knowledge of complex network so that they will have the confidence to initiate research in this extremely rapidly growing, interdisciplinary field. The course will be conducted according to the following three aspects of complex networks: (1) structure and topology, (2) dynamics, and (3) security. Some course materials will be based on research results from Instructor's group. Application examples from a variety of disciplines will be drawn to illustrate the basic principles. The course would be interesting to students from Applied Mathematics, Physics, Computer Science, Engineering, Biological Sciences, and Social Sciences.

#### **Tentative Course Topics:**

Basic mathematics of graphs, random networks, small-world networks, scale-free networks, biological networks, social networks, centrality measures, PageRank, betweenness, fundamental network algorithms, percolation and network resilience, synchronization, epidemics on networks, security of complex networks, reverse engineering of complex networks, and controllability of complex networks.