

## DA 516 – Social Network Analysis

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### Meeting Times and Locations

Saturday	09:00 – 12:00
Wednesday	19:00 – 22:00

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### Instructor

Ahmet Onur Durahim      [onurdurahim@sabanciuniv.edu](mailto:onurdurahim@sabanciuniv.edu)

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### Course Description, Aim and Content

Understanding the interconnections among entities such as people, web sites, etc., has become important part of research aimed at analyzing complex social and information networks. In this course, we will discuss how to practically analyze large scale social and information networks and how to reason about them through models for network structure and evolution. In this regard, we will talk about network properties and graphs models where we will discuss random networks, the small world phenomena, and scale free properties. We will then consider networks with signed edges, structural balance and strength of weak ties. Evolution of the networks, both microscopic and macroscopic evolution, will also be discussed. After that, we will examine decision based and probabilistic models of cascades and structure of the web. Additional topics to be covered will include Meme tracking, Influence Maximization, Outbreak and Community Detection and Predicting Cascades. Students will be experimenting on real-world large scale network data and will be able to construct a network from raw data and reason about the characteristics of underlying network structure, and extract useful insights.

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### Topics

- Social and Information Networks
- Basic Network Properties and Graphs
  - Random Networks
  - Small-world and Scale-free Properties
  - Models of Network Formation
- Networks with Signed Edges
  - Positive and Negative Relationships
  - Structural Balance
- Strength of Weak Ties
  - Community Detection
- Cascading Behavior
  - Decision based Models
  - Probabilistic Models of Information Flow
  - Outbreak Detection
- The structure of the Web, Hubs and Authorities
  - Link Analysis: PageRank and HITS
  - Link Prediction and Network Inference
- Influence Maximization
- Meme tracking

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**Grading**

Assignments (at least 4)	40%
Course Project	30%
Final	30%

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**References**

D. Easley and J. Kleinberg. "[Networks, Crowds, and Markets: Reasoning About a Highly Connected World](#)", 2010

Laszlo Barabasi et al., [Network Science](#), in progress

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**Announcements and SUCourse**

Students are responsible for all announcements made during the regular class meetings. Students should follow the SUCourse site for this class regularly as they are responsible for all announcements and postings on this site.

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This document may be modified during the semester (Spring 2014-2015) due to unforeseen reasons.