Networking & Communications

Prof. Gil Zussman
In 2012, the number of cellular users exceeded the number of toothbrush users.
Enabled by: Networking and Communications
Wireless and Wireline Networks

- LTE
- ZigBee
- Bluetooth
- RFID
- DAS
- LTE Advanced
- Het-nets
- 5G

Cellular Networks
Local Area Networks
Body/Personal Area Networks

- Data center networks, cloud computing
- Optical networks
- Content distribution networks

Short < Range > Long
Low < Data Rate > High

Internet of Things
Access/Aggregation
Core
Edge
Networks - Challenges

• Available anytime and anywhere, and be accessible from any device
• Incorporate new technologies, support/enable new classes of applications and services, and meet new requirements
• Scale and adapt to types of applications, topology, mobility patterns, and heterogeneity of devices
• Easily controllable and manageable, resource and energy efficient, secure and resilient to failures and attacks
Classes

Policy, Security

Application
Transport
Network
MAC
PHY

Networking
Communications
Analytical tools
ELEN E6770 Topic: Next Generation Networks
ELEN E6776 Topic: Content Distribution Networks
ELEN E6713 Topic: mmWave and applications for 5G
Additional Classes

- **Communications (CS)**
  - COMS 6998 Topics In Computer Science, I – Information theory in TCS
- **Networking (EE, CS)**
  - ELEN 4905 Topic: Cyber Security
  - COMS 4113 Fundamental-Large-Scale Distributed Systems
  - COMS 4995 Topics In Computer Science – Internet Tech Econ Policy
  - COMS 6995 Topics In Computer Science – Video over the Internet
  - COMS 6998 Topics In Computer Science – Cloud Computing & Big Data
- **Analytical Tools (CS, IEOR)**
  - CSOR 4231 (or 4246) Analysis of Algorithms I (Algorithms for Data Science)
  - IEOR - Stochastic models, Optimization, etc.
General Advice

• It’s a short program – plan ahead
• Consider classes beyond the EE dept.
  – e.g., Networking classes – in EE and CS
• Participate in a research project/s (spring or summer)
• Look for a summer internship (winter)