Objective:
This course will cover the fundamental principles of wired networks with focus on layered architecture, protocols, implementation and issues specific to the Internet. The objective is to provide an understanding of how the Internet works.

Contents:
- Introduction to computer networks and the Internet
  - Network edge, core and access
  - Delay, loss and throughput in packet switched networks
  - Protocol layers and service models, encapsulation-decapsulation,
- Application layer principles
  - Principles of network applications
  - HTTP protocol
  - DNS service and its architecture
- Transport layer principles and reliable data transfer
  - Reliable data transfer principles
  - Multiplexing and Demultiplexing
  - TCP protocol, segment structure
  - Flow control, congestion control
- Network layer addressing and routing
  - Forwarding and routing
  - Router design
  - IPv4 protocol and addressing
  - Routing algorithms
  - Routing in the Internet
- Data-link layer services and functions
  - Link layer Services
  - Error detection and correction
  - Medium access control layer: ALOHA, CSMA, CSMA-CA
Outcomes:

- Students will be able to understand networking protocols, simulation and practical implementation of layer wise protocols including router programming.
- Explain the concept of packet-switching, and identify and analyze the different types of packet delay in packet-switched networks.
- Describe the essential principles of a transport layer protocol (reliable data transfer, flow control, congestion control).
- Use IP addressing and apply routing algorithms to find shortest paths for network-layer packet delivery.
- Describe and compare data link layer services and multiple access techniques.

Textbooks:

- Wireshark (http://www.wireshark.org/)

Grading Policy:

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