Communication Networks (3)
Data transmission, encoding, link control techniques; communication network architecture, design; computer communication system architecture, protocols.
Prerequisite: CMPEN 271; Concurrent: STAT 301 or STAT 318, or STAT 401 or STAT 414 or STAT 418.


Course Objectives: The objective of the course is to ensure that students have the necessary networking skills to design, implement, and analyze communication networks. Various standards and protocols will be covered. Students will be able to design, implement, and analyze communication networks.

Primary Course Outcomes: Upon completion of the course, students should possess the following skills:

- As primary outcomes students:
  - Understand the fundamentals of data communication and communication networks.
  - Have the capability of designing and analyzing data transmission protocols and data link control protocols.
  - Have knowledge of various network protocols including TCP/IP, and demonstrate the skills to design and evaluate network protocols.
  - Be able to discuss major trends in industry and current research activities within the discipline.

As secondary outcomes students:

- Apply the principles of data communication and communication network techniques to design and evaluate new protocols.
- Skills to implement networking protocols using TCP/IP based on socket programming.
- Demonstrate independent learning and analyzing skills by using new IETF standards to solve technical problems.
- Have basic understanding of network security issues.

Relationship to Undergraduate Program Outcomes: Be able to discuss major trends in industry and current research activities within the discipline.

Required Topics: (38 hrs total)

- Communication model and protocol architecture (3 hours)
  - Communication model
  - OSI and TCP/IP protocol architecture
- Data communication (8 hours)
  - Data transmission
  - Data encoding and modulation
  - Data link control
- Wide area networks (7 hours)
  - Circuit and packet switching
  - ATM
  - Congestion control
- Local area networks (10 hours)
  - Lan technologies
  - Ethernet, token ring, wireless LAN
• Communication architecture and protocols (12 hours)
  - Internet protocols (IP)
  - Routing protocols and differentiated services
  - Transport protocol (TCP)

Class Format: Three lectures/week. Each lecture/lab is 50 minutes.

Professional Component: CMPEN 362 is a required course for computer engineers and an elective course for junior/senior computer scientists who are interested in networks and network design. The course provides an understanding of communication networks and the ability to analyze and design such networks. Given that virtually all jobs in computer engineering and computer science impact networks, this understanding is essential.

Evaluation: 70% proctored assessments (exams)
            30% unproctored assignments (homework)

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