

1. *Course number and name*

**ENGR 476: Computer Communication and Networks**

2. *Credits and contact hours*

3 credit hours; one 100-minute lecture session/week and one 2-hour-45-minute lab session/week

3. *Instructor's or course coordinator's name*

Instructor: Hamid Shahnasser, Professor of Electrical and Computer Engineering

Course coordinator: Hamid Shahnasser, Professor of Electrical and Computer Engineering

4. *Text book, title, author, and year*

Behrouz A. Fourouzan, *Data Communication and Networking*, McGraw Hill Higher Education, 2007

a. *other supplemental materials*

Arista Networks User Manual

5. *Specific course information*

a. *brief description of the content of the course (catalog description)*

The course will cover OSI reference model, Ethernet, Frame Relay, ATM, and SONET topics, TCP/IP, DNS. HDLC (High-level Data Link Control) protocol and Routing algorithms. ARP (Address Resolution Protocol) and Ethernet protocol. LACP (Link Aggregation Control Protocol), MLAG (Multichassis Link Aggregation), ACL (Access Control Lists)

b. *prerequisites or co-requisites*

ENGR 356, ENGR 213 or CSC 210; all with a grade of C- or better

c. *indicate whether a required, elective, or selected elective course in the program*

Required for Computer Engineering; elective for Electrical Engineering.

6. *Specific goals for the course*

a. *specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.*

- Student will learn various local area network protocols
- Student will learn the wide area networking protocols and technologies
- Student will learn about the Transmission Control Protocol/Internet Protocol
- Student will learn about Internetworking devices such as bridges and route
- The student will demonstrate an ability to solve problems related to High-level Data link control (HDLC) and routing algorithms.
- The student will demonstrate an ability to analyze ARP (Address Resolution protocol) and Ethernet protocols.
- The student will demonstrate a skill in using software tools such as Wireshark for network traffic monitoring and debugging.

- The student will demonstrate knowledge LACP protocol used in the data link layer of the OSI model.
- The student will demonstrate the skill of connecting two or more physical links on multiple switches into a single logical link.
- The student will demonstrate a working knowledge of Access Control Lists

b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.*

Course addresses ABET Student Outcome(s): a, b, c, e, k.

7. *Brief list of topics to be covered*

In class:

- Background Review: OSI Model, Transmission and Media
- IEEE 802.3 Ethernet local area network
- Network Layer: Logical Addressing, Address mapping, Error reporting
- Virtual circuit networks: Frame Relay and Asynchronous Transfer Mode (ATM)
- Synchronous Optical Network (SONET/SDH)
- Transmission Control Protocol/ Internet Protocol (TCP/IP)
- Domain Name System (DNS)

In Lab:

- HDLC (High-level Data Link Control)
- Routing Algorithms
- Introduction to Wireshark
- ARP (Address Resolution Protocol)
- Ethernet Protocol
- Intro to Arista-7050T Switches
- Link Aggregation Control Protocol (LACP)
- Multichassis Link Aggregation (MLAG)

Access Control Lists (ACL)