Syllabus

ECE 462 - Data and Computer Communications

Course Number: ECE 462
Prerequisites: STAT 344 or 346, and ECE 220, and ECE 331 or 303, all with grade of C or better.

Instructor: Bijan Jabbari, Professor
Semester: Fall 2014
Lecture Time: Tuesday and Thursday 1:30-2:45pm
Location: Nguyen Engineering Building 1109
Office: Eng. Bldg. Room 3232
Office phone: 993-1618
Email: bjabbari@gmu.edu
Web: http://cnl.gmu.edu/
Office hours: Thursday 3:00-4:30 pm, other times by appointment

Teaching Assistant: Nazanin Rastegardoost Email: nrastega@gmu.edu
Office hours: Wednesdays 2:00-4:00 pm & Thursday 11:00 am-1:00 pm in Engineering building Room 3204

Administrative Assistant: TBD

Course Description (updated)
Introduces modern data communications and computer networks. Topics include point-to-point communication links and transmission of digital information, modems, and codecs; packet switching, multiplexing, and concentrator design; multiaccess and broadcasting; local area and wide area networks; architectures and protocols for computer networks; Internet Protocols architecture and layers; physical interfaces and protocols; data link control layer and network layer. Provides examples of data networks.

Course Objective
This class will cover necessary theoretical foundation and the protocol and architecture of modern computer communication networks, including LANs, MANS, WANs and other packet switched networks. Particular attention will be given to Internet architectures and protocols. It is designed to introduce the basic concepts in data communications, computer networks and the Internet Protocol and Architecture as well as relevant standards to students majoring in Electrical and Computer Engineering, Computer Science, or a related field.

Note to those who are taking the course
This is a senior-level undergraduate course for students who wish to gain a broad understanding of data communications, communication networks and Internet protocols. Students are expected to have a basic knowledge of applied probability, signals and systems, and familiarity with MATLAB. There will be several real-life projects related to data communications and students will use MATLAB for implementation or simulation. These projects complement the theoretical aspects and have considerable pedagogic value in helping students understand concepts and design. Note that while use of
MATLAB is encouraged for carrying out the projects, students may use other general-purpose programming languages such as C, C++ or JAVA.

**Course Outline**

- Course overview and Introduction, basic concepts in data communication networking, layering concept and communication network architectures
- Fundamental concepts and theoretical basis for data transmission
- Data transmission, transmission media, channel impairments, channel capacity
- Transmission media, guided and unguided transmission; propagation, wireless transmission
- Signal encoding techniques, transmission media, modem signal constellations, quantization, PCM, binary encoding techniques, transmission of analog and digital signals
- Digital data communications techniques; synchronous and asynchronous transmission, error detection and correction
- Data link control protocol
- Multiplexing and spread spectrum
- Circuit and packet switching
- Routing in Switched Networks
- Cellular Networks
- Local Area Networks and VLANs
- Internet Protocol and TCP/IP
- Wireless LANS

**Textbook and References**


**Grading:**

There will be weekly assignments, two tests, and a final exam. They will count towards the grade as follows:

- Homework 5%
- Exam 1 and 2, 25% each (1.15 hrs)
- Final Examination 45% (2.5 hrs)

The two tests and the final exam will be in-class and closed-book. Students will be provided with formula sheets to avoid memorization.