TCOM 370 Homework 99-1

In studying the material for this course, the Notes and lectures are the primary sources, with the text-book providing additional material, further details, reinforcement, or alternative viewpoints. The classroom discussion together with the Notes will define the scope of the material that you need to be familiar with. At times, specific sections in the textbook may be assigned for reading, or a problem may be assigned on it, without any classroom discussion or Notes. In this case you are responsible for this material also.]

Reading Assignment:

Chapter 1:

You are to acquire an overall appreciation of the material in Chapter 1 of your text book (Halsall). This material should be read in conjunction with Notes 99-1. Pay particular attention to Section 1.3 in Chapter 1.

Chapter 2

You are responsible for the following sections: (by January 31, 1999)

Introduction, 2.1;

2.2 (important);

2.3 skim;	focus on ideas of TDM and FDM in **2.3.4**; idea of random access, fixed and demand assigned access, Aloha, TDMA and FDMA in **2.3.6** (we will consider Aloha in more detail later)
2.4, 2.5 (important)	Ignore details on p. 75 and beyond

Several sets of notes will be handed out on the material in Chapter 2.

Problems: (To be done by January 26, 1998)

These **will not** be collected. Solutions will be posted.

1) In Notes 99-1, change the parameters of the example on p.p. 7-8 to the following and obtain the new answers.

   (a) Message size 5000 bits, all other parameters the same.
   (b) Message size 5000 bits, packet size 512 bits, other parameters the same.

2) 2.1 (Transmission media - descriptive)
3) 2.4 (Cellular radio - no analysis)
4) 2.5 (Channel imperfections - sketches)
5) 2.6 (Fourier Series) (Use results of Notes 99-2)
6) 2.7 (Fourier Series)

7) (a) Find the coefficients of the Fourier series representation of the following periodic trapezoidal waveform of period T sec. Sketch the *amplitude spectrum* A_n as a function of the corresponding frequency nf_0 for τ=1/3 sec. and T=1 sec.

   (b) For τ =1/3, and T=1, use MATLAB or Maple or any other means to sketch the approximations obtained using up to the n-th harmonic in the Fourier series, for n=3 and n=12.

   (c) Let τ =1/3, and let T=2. Sketch the amplitude spectrum in this case. The fundamental frequency f_0 is now 0.5 Hz and $1/\tau$ =3. Suppose that 3 Hz is the maximum frequency component of this waveform that a link can carry. Using Fourier series components of up to the 6-th harmonic of the fundamental frequency, plot the received waveform (plot on the time interval [-5/2,5/2]).