MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Electrical Engineering & Computer Science
**6.041/6.431: Probabilistic Systems Analysis**
(Spring 2006)

**Weeks 5**
**March 6-10, 2005**

**Topics: Continuous RVs (CDF, Normal RV, Conditioning, Multiple RV)**

1. **Recitation 07: Tuesday, Mar 7**

   (a) Problem 1: A drill problem to drive home the mechanics of finding expected value and variance for continuous random variables.

   (b) Problem 2: Makes use of CDF to derive the PMF

   (c) Problem 3: A classic signal detection problem illustrating the use of conditional densities and also use of normal CDF.

2. **Recitation 08: Thursday, Mar 9**

   (a) Problem 1: A graphical drill problem, to illustrate the mechanics of finding marginal, conditional densities/expected values/variances.

   (b) Problem 2: Another neat problem that makes use of conditional densities.

3. **Tutorial 5: Thursday/Friday Mar 9,10**

   (a) A drill problem to compute expectation and variance. Illustrate how it can be accomplished more easily using conditional expectations.

   (b) A problem illustrating use of a mixture of normal random variables. Stree on the use of the normal CDF function.

   (c) Further illustration of total expectation theorem. Part c makes use of Baye's theorem. Stress the memoryless property of the exponential distribution in part d.

4. **Pset 5: Wednesday Mar 8 (Due Mar 22)**

   (a) Problem 1: Drill problem to use CDF.

   (b) Problem 2: Communication problem illustrating the use of conditional pdf and also normal CDF function.

   (c) Problem 3: Illustration of conditional pdf and also inference using Baye's rule.

   (d) Problem 4: More mechanics of conditional probability, and normal RV.

   (e) Problem 5: Drill but interesting problems for derived pdf.

   (f) Problem 6: Neat trick to use independence property.