Student Name:

Homework # 1

Instructions: Prepare your deliverables in clean letter size printer-quality papers with a high-contrast pencil (engineering pads are also accepted). Attach this assignment sheet as cover page, show all your work, and box all your solutions. All Matlab code needs to be published, and all figures needs to have proper axis labeling and legends. Homework assignments will be collected during class time on the due date. *No late homework or submission that do not strictly follow the provided instructions will not be accepted.*

- **Homework problems not to be graded**
  - From textbook (Lathi):
    - Ch 1: 2.5, 3.1, 3.2, 4.1

- **Homework problems to be graded**

1) Review MATLAB documentation for the *rand()* and *randi()* commands.

2) Review MATLAB documentation for the *rng()* command. This command "seeds" the random number generator and should be executed each time you begin MATLAB.

3) Generate a MATLAB routine to simulate the tossing of a fair coin and plot the probability estimate for "heads" versus the number of trials up to a maximum of 5000 trials. Label the y-axis as "P[Heads] Estimate" and the x-axis as "# of trials". Explain your result.

```
% ECE 647 hw 1

% Generate a MATLAB routine to simulate the tossing of a fair coin and plot
% the probability estimate for "heads" versus the number of trials up to a
% maximum of 5000 trials. Label the y-axis as "P[Heads] Estimate" and the
% x-axis as "# of trials". Explain your result.

trials = 5000;
Oheads = 0;
Pheads=trials;
for i=1:trials
    if rand(1) < 0.5
        Oheads = Oheads + 1;    % 1 represents heads
    end
    Pheads(i) = Oheads / i;
end

plot(Pheads);
axis([0 trials 0 1]);
xlabel("# of trials");
ylabel("P[Heads] Estimate");
title("Trials vs. P[Heads]");
```