ENSC380
Lecture 0

Welcome to ENSC-380

Instructor: Atousa Hajshirmohammadi
Office: ASB-9833

What is 380?

This course introduces you to the basics of signals and systems analysis;

- **Signal** is any physical phenomenon which conveys information and usually varies with time.
- **System** responds to signals and produces new signals.
- **Excitation signals** are applied at system inputs and **response signals** are produced at system outputs.
- Example:

Emma Drink and Wet Bath Baby Doll. Source:http://blog.tmcnet.com/ItemId/B000BOKAU0/image

What is 380 (Cont.)

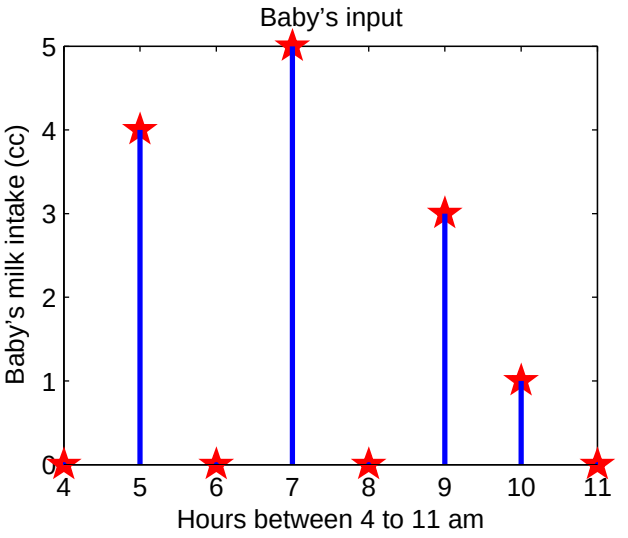
The main objectives of ENSC-380 are:

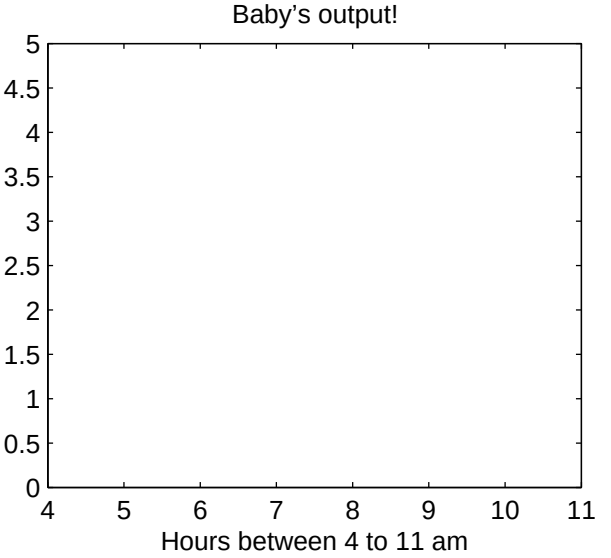
- Introducing "Mathematical methods" for describing signals and systems, both in continuous-time and discrete-time. The systems considered in this course are “linear and time invariant (LTI)”.
- Using “transform methods” (e.g. Fourier transform, Z-transform) to analyze continuous and discrete-time LTI systems.
- Introducing the "sampling theorem" and its application to conversion between continuous-time and discrete-time signals and systems.
- Using these mathematical methods to simulate examples of systems and their operation in MATLAB.

Modeling the Baby Example

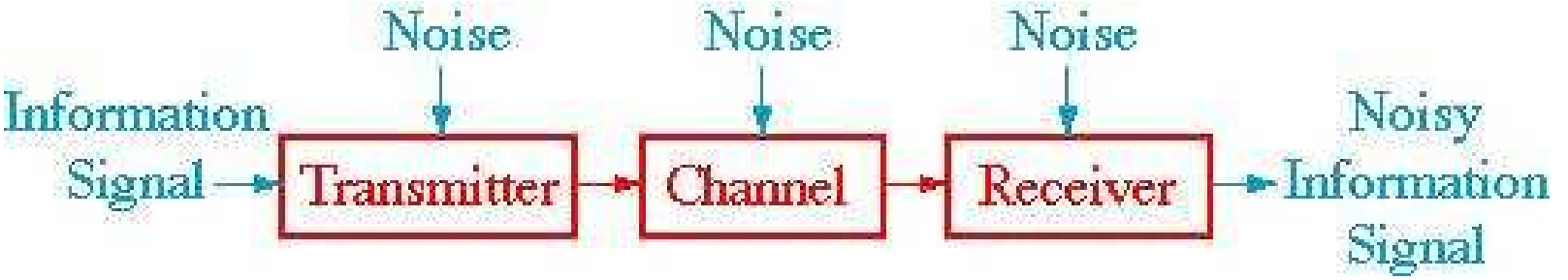
- Try to mathematically model the baby example.

- Baby's milk intake between 4 to 11 am is given below, what is her expected output?!





Communication System



- Input signal(s):
- Output signal(s):
- Channel model? (assume 20% signal attenuation and additive noise)
- We need the mathematical models for the transmitter and receiver as well, before we can analyze the full system.

Why learn 380?

- Almost any phenomenon in our daily life consists of signals processed by systems. From seeing and recognizing a red rose, to driving your car, operating your cell phone, . . .
- “Signals and Systems Analysis” is the backbone of many subjects in electrical engineering. Exactly the reason why 380 is a pre-requisite to many of your future courses, 327, 328, 372, 383, 424, 429, 483, ...
- Why **Linear** systems? Linear systems are much simpler than non-linear system (to design and analyze). Although almost all real life systems are non linear, many can be approximately modeled by a Linear System fairly accurately.

Course Information

- Course Home page:
  http://www.ensc.sfu.ca/ atousah/personal/TEACHING/380/ensc380.html

  Please bookmark this URL and make sure you visit your course home page often. Detailed information about the course, as well as, course notes, assignments, solutions, and important announcements are posted on this website.
- Course Notes: are posted on the course home page for each session. Before each lecture, print the Course Notes corresponding to that session and bring with you to class. Try to review your notes in advance so that you have an idea of what to expect during that lecture. Posted notes have frequent blanks in them which we will fill out together during the lecture.
- **Completed notes will not be posted online. If you miss a class, try to go through your notes and complete them as much as you can. Then meet with me or your TAs for questions you may still have and to double check your completed notes. Do this as soon as you can, don't wait until the end of semester!**