Introduction to Signal Processing

PSYCH 711/712

Winter Term - 2008

1 Contact Information

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2 Course Information

Overview: The goal of this course is to introduce students to basic aspects of digital signal processing, including sampling, the Fourier Transform, and the design and use of linear filters. A conceptual, practical approach to understanding the material is emphasized. The course is designed to accommodate students with little or no previous experience in this area. The lectures will be supplemented by weekly, one-hour labs in which students will use MatLab to solve signal processing problems drawn from the class discussion.

Text: There is no textbook for this course. Readings will be taken from several sources, most notably Lyons (2001), Understanding Digital Signal Processing (Prentice Hall, Upper Saddle River, NJ). Reading assignments will be available as PDF files that can be downloaded from the course website.

Meeting Time and Place: The course begins on February 28. Lectures will be held on Thursdays, 11:30-2:30, in room PC-204. The labs will be on Fridays, 10:00-11:00 in room PC-403.

Grading: Grades will be based on take-home assignments (40%), class participation (10%), and a final exam (50%).

It is the student’s responsibility to notify the instructor of the reasons for missing a test in a timely fashion. Students who miss a test due to illness must submit a McMaster University Student Medical Certificate and a Missed Term Work form to the Associate Dean for Graduate Studies within five business days of the missed exam. Both forms are available at

http://www.science.mcmaster.ca/~associatedean/services/exemptions.html
which also contains a fuller description of the University’s policy regarding missed term work.

**Academic Integrity:** Students are responsible for demonstrating behaviour that is honest and ethical in their academic work, and are expected to be familiar with the University’s regulations regarding academic integrity (see section 6.1, Graduate Calendar 2007-08, pp. 15-16).

3  **Take-home Assignments**

Take-home assignments (a.k.a., homework) will be distributed at the end of each lab. Assignments are due at the beginning of class on the following week.

4  **Schedule of Lectures**

The following schedule is only approximate: Dates for lectures, **but not the final exam**, may be changed as we progress through the term.

- Feb 28: Harmonic Analysis (Reading: T.B.A.)
  - Lab: Introduction to MatLab
- March 6: Periodic Sampling (Reading: Lyons, pp. 1-20; 23-48)
  - Lab: Sampling & Aliasing
- March 13: The Digital Fourier Transform (Reading: Lyons, pp. 49-80 & 89-97)
  - Lab: Properties of the Fourier Transform
- March 20: Finite Impulse Response (FIR) Linear Filters (Reading: Lyons, pp. 157-194)
  - Lab: Frequency Representation of Temporal (or Spatial) Filtering
- March 27: Applications of FIR Filters & Spectral Methods (Reading: T.B.A.)
  - Lab: Noise Reduction & Deblurring
- April 3: Applications of FIR Filters & Spectral Methods (Reading: T.B.A.)
  - Lab: Coherent vs. Incoherent Signal Averaging
- April 10: Final Exam