

University of Toronto at Mississauga, Spring 2008

## csc310 – Information Theory

Information theory is about the reliable and accurate transmission of information. It is central to such applications as lossless data compression (e.g. ZIP files), lossy data compression (e.g. MP3s), and channel coding (e.g. for DSL lines). It also lies at the heart of many exciting areas of contemporary science and engineering. Its impact has been crucial to the success of the Voyager missions to deep space, the invention of the CD, the feasibility of mobile phones, the development of the Internet, the study of linguistics and human perception, the understanding of black holes, and numerous other fields.

**Topics Covered:** entropy, data compression, optimal compression, information channels, channel capacity, error-correcting codes and digital fountain codes.

**Prerequisites:** CSC148H5; STA257H5; MAT223H5. If you do not have these courses, but have a basic knowledge of probability, calculus and linear algebra and basic programming skills, please see the instructor.

**Instructor:** Anthony Bonner, email: bonner [at] cs [dot] toronto [dot] edu,  
office: CC 4004 (UTM), BA 4268 (St George), office hours: by appointment,  
phone: 905-828-3813 (UTM), 416-978-7441 (St. George).

**Classes:** Wednesday 4-6pm, NE 174.

**Tutorials:** Thursday 2-3pm, NE 236.

**Web Page:** <http://www.cs.toronto.edu/~bonner/courses/2008s/csc310/>

**Grading Scheme:** Four assignments, 15% each; Midterm test, 15%; Final exam, 25%. The final exam will be based on the assignments and will assume that you have completed them by yourself. On all work, 20% of the mark will be for quality of presentation, including the use of *good English*. Late assignments will not be accepted. Final marks may be adjusted up or down to conform with University of Toronto grading policies.

**Text:** David MacKay, *Information Theory, Inference and Learning Algorithms*, Cambridge University Press. Freely available on the web.

**Plagiarism and Cheating:** The academic regulations of the University are outlined in the *Code of Behaviour on Academic Matters* which can be found in the UTM Calendar or on the web at <http://www.utm.utoronto.ca/regcal/WEBGEN117.html>.