POLICIES/SYLLABUS

Instructor

Eric Moorhouse, Ross Hall 216, 766-4394, moorhous@uwyo.edu
Office hours M 11–11:50 am; TR 10–10:50 am (subject to change; see http://www.uwyo.edu/moorhouse/schedule.html for most current information). Also available by appointment, and often by simply dropping by.

Prerequisite

Elementary Linear Algebra (MATH 2250 or equivalent, or permission of instructor). If this constitutes an obstacle for you, or if you are not confident about your background preparation for this course, please speak with me. It is my goal to be as accommodating as possible.

Class Meeting

MWF 8:00–8:50 am in Ross 247

Textbook


References/Additional Reading


   (the paper that started it all!)


    [http://www.maths.qmw.ac.uk/~pjc/preprints/cmt.ps](http://www.maths.qmw.ac.uk/~pjc/preprints/cmt.ps) (also available in dvi format)

    [http://www.ece.arizona.edu/~ryan/publications/turbo2c.pdf](http://www.ece.arizona.edu/~ryan/publications/turbo2c.pdf)

**Topics**

Choice of topics covered will depend largely on student background and preferences; however, the following is a tentative list of topics to be covered.

<table>
<thead>
<tr>
<th>Information Theory</th>
<th>Error-Correcting Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shannon’s Theorem</td>
<td>Bounds for Codes</td>
</tr>
<tr>
<td>Entropy of a Source</td>
<td>Hamming Codes</td>
</tr>
<tr>
<td>Channel Capacity</td>
<td>Reed-Solomon Codes</td>
</tr>
<tr>
<td>Data Compression</td>
<td>Reed-Muller Codes</td>
</tr>
<tr>
<td>Entropy Rate of a Stochastic Process</td>
<td>BCH Codes</td>
</tr>
<tr>
<td>Quantum Cryptology</td>
<td>Weight Distributions</td>
</tr>
<tr>
<td>Quantum Codes</td>
<td>Cyclic Codes</td>
</tr>
<tr>
<td>Quantum Computation</td>
<td>Algebraic-Geometric Codes</td>
</tr>
<tr>
<td></td>
<td>$Z_4$- Linear Codes</td>
</tr>
<tr>
<td></td>
<td>Turbo Codes</td>
</tr>
<tr>
<td></td>
<td>LDPC Codes</td>
</tr>
</tbody>
</table>

In order to minimize redundancy with other courses in our programme, we plan not to cover cryptography (with the exception of quantum cryptography).
Course Website

The website http://www.uwyo.edu/moorhouse/courses/5590/ will periodically be updated with course-related announcements and information, electronic versions of course handouts, relevant links, etc.

Grading

Graduate students registered for this course for 3 credits will receive a letter grade. Normally this grade will be based on participation (30%) and homework (70%). There will be no exams or tests in the course.

The instructor reserves the privilege of arranging office visits (i.e. private appointments) with students in order to monitor individual comprehension of the material, and attendance at such appointments will count for a portion of the grade for participation. Participation includes regular class attendance, engaging in classroom discussion (such as by asking or answering questions), and attendance at office visits.

You are encouraged to consult with me at any time regarding your performance in the course. It is my hope that the letter grade for the course will not be of primary concern to you, and that your focus will rather be on expanding your knowledge and learning new ideas.