92.448, 92.548   Mathematics of Signal Processing
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Text: The text for the course is the January 16, 2012 version of my book "Mathematics of Signal Processing: A First Course" , available on my web site,

http://faculty.uml.edu/cbyrne/cbyrne.html

under ALL COURSES, 92.448-548. It is a considerably modified version of the book "Signal Processing: A Mathematical Approach" , published by AK Peters, Wellesley, MA in 2005.

Prerequisites: The course 92.548 is part of the master's program in Applied and Computational Mathematics, but is not restricted to students in that program, or even to mathematics students. The course is also numbered 92.448 so that it can be taken as an upper level math major course. The basic tools for mathematical signal processing are Fourier series and Fourier transforms, matrix theory, and probability and statistics. It is helpful, but not essential, to have had some prior exposure to these topics.

Course Format: Lectures will be drawn from the text. There are numerous exercises throughout the text. Students are required to keep a separate notebook containing worked exercises, to be graded twice during the semester; the course grade will be based entirely on submitted exercises. The choice of exercises is left to the student, with the hope that he or she will skip ones that they find familiar and concentrate on those involving material that is new to them or, at least, less familiar. The text contains appendices on background material that the student may find helpful. These appendices also contain exercises the student may wish to attempt.

In addition to the mathematical exercises, there are a number of computer exercises throughout the text. Although these are not required assignments, it is certainly a good idea to do the programming suggested by some of these exercises, to get hands-on experience experimenting with the various algorithms involved. The choice of software is left to the student.

Students who register as undergraduates under the course number 92.448 will have a final exam. Students in 92.548 are welcome to take this exam also; it can only improve the course grade, not lower it. Attendance is probably helpful, but is not required.

Although I have tried to rid the text of typos and mistakes, I am sure there are still some lurking. If you find any, please let me know.