SYLLABUS FOR MATH 464, FALL 2006

Tuesday, Thursday 9:30 a.m. - 10:45 a.m.

MTH 0411

Prerequisite: MATH 246 and 400-level mathematics or electrical engineering courses, perhaps taken concurrently.


Instructor: Dr. Wojciech Czaja
Office: MTH 4406
Office Hours: Tuesday, Thursday 11 a.m. - noon, or by appointment
Phone: (301) 405 - 5106

Exams: There will be three midterm exams during the semester, each for the total of 50 points: October 3, November 7, December 7. The final exam is scheduled for December 15th, 8 a.m. - 10 a.m. It is worth 100 points.

Calculators: Calculators will NOT be allowed for the exams or quizzes, but small (5 x 3 in.) note cards will be allowed during the exams.

Quizzes and Homework: Each Thursday of the week that has no exam scheduled, there will be either a homework or a quiz assigned. (Homeworks are due the next Tuesday.) Each one is worth 10 points, and there will 10 of such assignments.

Grading: The maximum point total is 350 points and the total used to calculate the final grade is the minimum of the two numbers: 350 points and the largest score in the class. The setting of letter grades will be based on the number of points and will be no worse than: 50% - D, 60% - C, 75% - B, 90% - A.

Students who obtain during the semester at least 225 points, receive A without attending the final. Students who obtain during the semester at least 200 points but not more than 224, may receive B without attending the final.
OUTLINE OF MATERIAL (A VERY AMBITIOUS ONE)


Fourier series (Representation theory: Dirichlet’s theorem and examples. Differentiation and integration of Fourier series. The L1 and L2 theories. Absolutely convergent Fourier series and Wiener’s inversion theorem. Gibbs phenomenon.)


Differential equations (Applications of Fourier transforms, Fourier series, and Laplace transforms to ODE’s and PDE’s. These include recent applications in signal processing, classical applications in mathematical physics, initial and boundary value problems, Bessel functions, etc.)

DFT and FFT (Definition and properties of the DFT. Description of the FFT algorithm, and examples. Applications with MATLAB.)

Wavelet theory and MATLAB (Shannon wavelets and the classical sampling theorem. Multiresolution and analysis wavelet orthonormal bases. Quadrature mirror filters and perfect reconstruction filter banks. Multidimensional results. Wavelet packets. Applications with the MATLAB Wavelet Toolbox.)