

MAT 782, Spring 2010

Instructor: Dr. Yuesheng Xu

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Office Hour: 10:00-11:00, Monday and Wednesday, and by appointment

Text Book and Papers: (1) *Fourier Analysis and Applications*, by C. Gasquet and P. Witomski, Springer, 1999. (2) Selected research papers.

Learning Goals of the Course: Understanding the basic concepts and mathematical development in Fourier analysis. Mastering the basic computational techniques in multi-dimensional fast Fourier analysis.

Course Description: This course introduces students to basic topics of multi-dimensional Fourier analysis. The course is designed to bring to students the cutting edge of multi-dimensional fast Fourier analysis. Students should be ready to conduct research in the related area after taking this course. We shall cover the following topics:

- Fourier analysis for one-dimensional functions
- Fourier expansions for multi-dimensional functions
- Multiscale analysis
- Sparse representation and approximation
- Fast Algorithms for Fourier expansions of a high dimensional function
- Applications of high dimensional Fourier transform

Exams and Grades: The course examination includes one numerical project assignment and one presentation. Both will be graded. The course grade will be computed as follows:

- Project assignment: 50%
- Presentation (Oral Exam): 50%

Academic Integrity: The Syracuse University Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the Policy and know that it is their responsibility to learn about instructor and general academic expectations with regard to proper citation of sources in written work. The policy also governs the integrity of work submitted in exams and assignments as well as the veracity of signatures on attendance sheets and other verifications of participation in class activities. Serious sanctions can result from academic dishonesty of any sort. For more information and the complete policy, see <http://academicintegrity.syr.edu>