

## Waves in Complex Media: Scattering of Waves by Periodic Structures

Math 4999-5, Spring 2009

Louisiana State University

Time: 277 Lockett Hall

Room: Tuesday and Thursday 3:30–4:50

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Office hours: Monday, Wednesday, and Friday, 10:40–12:00; or by appointment

Course web site: [http://www.math.lsu.edu/~shipman/courses\\_09A-4999.html](http://www.math.lsu.edu/~shipman/courses_09A-4999.html)

**Description.** This is a “Vertically Integrated Research” course. Its structure is like that of a seminar, in which professors, post-docs, graduate students, and undergraduate students participate and mutually benefit. The aims are

- (1) to give the participants relatively broad exposure to electromagnetic, acoustic, and elastic waves in composite media and computational techniques;
- (2) to delve in depth into the details of a specific problem;
- (3) to develop effective presentation skills;
- (4) to gain exposure to specialized areas of mathematics involved in the physical problems.

**Credit.** Both graduate and undergraduate students can enroll for this course. For undergraduates, it counts toward the three credits of capstone course that are required for the math major.

**Prerequisites.** Math 2057 (multivariable calculus) for undergraduate students; Math 7311 (real analysis) for graduate students.

**Structure.** The main components of the course are

*Lectures:*

Expository lectures by Prof. Shipman on waves in periodic structures

Lectures by graduate students on special topics (S. Fortes, S. Jimenez, H. Ngo, H. Tu)

Lectures by other faculty (Prof. Lipton, Dr. Mengesha)

Participation in the Applied Analysis Seminar (Mondays at 3:40)

*Projects:*

Projects by the undergraduate participants.

Oral and poster presentations of the projects

*Mentoring:*

Graduate students and professors will happily mentor undergraduate students.

**Projects.** The projects will involve theory, literature research, and/or scientific computation and computer programming, and may be group efforts. The results will be presented

- (1) in a written paper,
- (2) on a professional-style poster, and
- (3) orally in a forum open to the public.

**Evaluation.** There will be no exams or regular assignments, but students may be asked to present their work orally or in written fashion occasionally throughout the semester. Evaluation of performance in the course is based on participation and the quality of the project, in written, poster, and oral presentation.