Math 4325, Section I
FOURIER TRANSFORMS

Textbook: David W. Kamler: A First Course in FOURIER ANALYSIS. Also information posted on my web-page

Time: 1:40–3:00, Tuesday and Thursday in Lockett 132.

Instructor: Gestur Olafsson

Office: 322 Lockett

Office Hours: Tuesday, 3:00-4:00 and Thursday 11:00-12:00. You can also contact me by e-mail for other appointments.

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web-page: www.math.lsu.edu/~olafsson . This syllabus along lecture notes, homework problems, test dates, and solutions to tests, quizzes and homework will be available at this address. You can also find old quizzes and tests, with solution, here.

Syllabus

The main objectives of this course are the following topics:

(1) Fourier series corresponding to periodic functions;
(2) Fourier analysis on the real line, the integers, and finite cyclic groups;
(3) the fast Fourier transform;
(4) generalized functions;
(5) attention to modern applications and computational methods.

We will start with material from the following chapter in the textbook:

- Chapter 1: Fourier's Representation for Functions on $\mathbb{R}$, $\mathbb{T}_p$, $\mathbb{Z}$, and $\mathbb{P}_N$.
- Chapter 2: Convolution of Functions on $\mathbb{R}$, $\mathbb{T}_p$, $\mathbb{Z}$, and $\mathbb{P}_N$
- Chapter 3: The Calculus for Finding Fourier Transforms of Functions on $\mathbb{R}$.
- Chapter 4: The Calculus for Finding Fourier Transforms of Functions on $\mathbb{T}_p$, $\mathbb{Z}$, and $\mathbb{P}_N$
- Chapter 6: The Fast Fourier Transform.
- Examples and Applications

We might discuss some other material (sampling, Chapter 8, Partial Differential equations, Chapter 9, and Wavelets, Chapter 10) depending on how much time we have.

Each class (except the first one) will start by discussing few problems that were assigned in the lecture before. Then we will go over new material and work out some examples and problems. I will offer a special **problem solving hour** each Wednesday at from 1:00PM to 2:00 PM. The room will be announced later.

There will be **three** tests in class (each 100 points). The dates are:

(1) February 21;
(2) March 21;
(3) May 2.

There will be around **8** quizzes+homework, each counting 10 points. I will only count **6** highest scores towards the final grade. Then there is a **FINAL** on **MAY 16, 5:30-7:30PM.** The final will count **200 Points**. The final grades are therefore:

	Points
Tests	300
Homework/Quizzes	60
Final	150
Total	510

Final Grades: A>459, B>408, C>357, D≥306. F<306

Here is a short list of some interesting book (Prices based on bn.com)

(1) R.M. Gray, J.W. Goodman: Fourier Transforms: An introduction for Engineers ($80.00)
(2) H.P. Hsu: Applied Fourier Analysis ($19.95)
(3) T. W. Korner: Fourier Analysis. (Contains lots of interesting examples and historical remarks, $49.95)
(4) J.F. James. A Student Guide to Fourier Transforms: With Applications in Physics and Engineerings ($18.95)
(5) I.N. Sneddon: Fourier Transforms. (Dover, $14.35)
(6) G.P. Tolstov, R. A. Silverman: Fourier Series (Dover, $10.75)