Homework and Mini-Projects

Homework problems will be assigned regularly; they will be collected and graded. The problems to be turned in will be marked by a star *. The unmarked problems are there for all of you as an additional practice. The list of problems will be posted on my homepage at


Homework is a major part of the learning process in Mathematics. It is essential that you think on your own about the notions presented and that you work on the problems on a regular basis. You can discuss the problems with other students, but you should turn in individual solutions. Expect a total of five or six homework assignments for the quarter.

During the quarter I will also assign a couple of mini-projects. The goal is to add to your knowledge some nice piece of mathematics that goes beyond what is presented in your textbook. The mini-projects are meant to be done individually NOT in groups. You are on your honor to follow this rule.

Please print clearly your name on the front page, and staple all the pages of your homework/projects. No late homework assignments or projects will be accepted!

Some Useful Advice

You will be expected to attend regularly the lectures and actively participate in them. Certain computations and proofs presented in a lecture will be regularly left as exercises. Even though they are most likely straightforward, you should take the time to make sure you know how to fill in the details. This routine will only add to your deeper understanding of a given topic.
When in class, please turn off your cell phones, beepers, etc and pay attention. If sometimes you find yourself confused or lost, know that it is ok, and you are not the only one. A. Einstein once said: “Do not worry about your problems with mathematics, I assure you mine are far greater.” Your job is to spend time at home (yes, sometimes lots of time) on clarifying the things you do not get. If you feel completely lost after trying on your own, do not hesitate to ask me for help.

Ideally, you should read the book in preparation for each class. Do not worry so much that you do not get all that is being presented, simply exposing yourself to the material the night before class will make your life easier the next day!

Regarding the homework to be turned in or the projects: do not expect me to do them for you! You can and should ask me questions during my office hours, but do not expect me to provide you with the solution(s). My help will almost always be in the form of an idea for you to try further on your own. Strive to be concise and neat in all your assignments if you want me to take the time to grade them.

The easiest way to summarize the recipe for success in this course is: only be concerned about learning some nice mathematics and enjoy being challenged in the process of doing so!

**Topics and Expectations**

The main goal of the course is to introduce you to some of the tools of Functional Analysis. The subject is a fusion of mathematical analysis and linear algebra. A good working knowledge of both these subjects (at the level of M522 and M304) is a prerequisite for the course. We will cover material in Chapters 1-8.

Upon completion of the course you should

- understand the main properties of Hilbert spaces, and more generally infinite dimensional normed spaces
- know how Hilbert spaces relate to Fourier series
- understand the notions associated with a linear operator, such as its adjoint and spectrum
- understand the spectral theorem for compact Hermitian operators
- have improved on your ability to make mathematical arguments about the notions of functional analysis, and write them up in a clear and concise manner

**Grading**

Your grade in the course will be determined by the performance in the homework, projects and the final exam:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>50%</td>
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<tr>
<td>Projects</td>
<td>30%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
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| Total           | 100%       |
The Final Exam will be comprehensive and it is scheduled for Wednesday, June 9, 1-4 PM (yes, 3 hours long!). Your final score will be based on the sum of all percentages. Letter grades will be assigned according to the following percentage scale: $100 \geq A \geq 90, 90 > A− \geq 87, 87 > B+ \geq 83, 83 > B \geq 79$, etc.

**Course policies**

Make sure your travel plans do not conflict with the date of your final exam. *There will be no make-up final, unless you have a very serious reason for missing it and I have been notified in advance.*