3090 - Methods in theoretical physics (Fall 2019)

Course instructor: Dr. Sean Tulin

Outline: This class will be a smorgasbord of different mathematical tools and concepts that are essential for the study of advanced topics in physics. The course will be broken in three units:

- Complex analysis: complex variables, residue theory
- Integral transforms: Fourier series and Fourier transforms, Laplace transforms, and Green's functions
- Vector spaces, eigenvalue problems, and group theory

Course text: There is no required text. *Mathematical Methods for Physicists* by Arfken, Weber, & Harris is useful reference for your shelf, but it is not pedagogical and we will not be following it closely.

Grading and tests: There will be weekly homework assignments, weekly in-class assignments, two midterm tests, and a final exam. Your final grade will be based as follows:

- Homework: Your homework grade (averaged over all assignments) counts 20%.
- Midterms: Each midterm (two in total) counts 20%. Tentatively scheduled for **Monday Oct 7th** and **Monday November 11th**.
- Final exam: 40%.

Homework policy: Homework problems are the most essential part of this class. Here are the rules:

- Assignments will be posted on Wednesdays and will be due on the following **Wednesdays before 4pm**. You may turn in your assignments during class or at my office. If I am not present in my office, slip it under my door. No emailed copies are accepted.
- Extensions: None will be given unless there is an emergency or other extreme circumstance. Late homework must be turned in during working hours and will be penalized 10% per 24 hours (this includes weekends too).
- Expectations: All homework you turn in will be entirely your own work. You may discuss homework problems with your peers, but you must write your own solutions independently. In other words, you may not be looking at anyone else's solutions while you are writing up your own.
- Homework solutions will be made available during class. No electronic copies of solutions will be provided.

Email policy: I try to respond to email questions as soon as I can. However, please obey the following guidelines:

- Please post all materials-related questions on Piazza (anonymously if you wish). If you are confused, likely others are too!

- Do **not** email me to request your grade on any assignment or in the course as a whole.
- **Please** email me if I forget to upload any course materials in a timely manner.
- **Please** email me if you find a mistake in any course materials.

Late policy:

- You may not arrive more than 5 minutes late to class.

Other information:

- Instructor email: stulin@yorku.ca
- Instructor office: Petrie 217
- Office hours: Mondays 2–3pm or by appointment.
- Course website: https://piazza.com/yorku.ca/fall2019/phys3090/