Math 450/550, Spring 2015
Syllabus

Title of the Course: Special Topics in Mathematics I (Mathematics of Quantum Mechanics)

Instructor: Ali Mostafazadeh (Office: SCI-154, Office hours: Tuesdays & Thursdays 10:30-11:00 & 13:00-13:30)

Textbooks:

1. L. D. Faddeev and O. A. Yakubouvskii, "Lectures on Quantum Mechanics for Mathematics Students" (AMS, 2009)

2. B. C. Hall, "Quantum Theory for Mathematicians" (Springer, New York, 2013)

Website: Visit **http://home.ku.edu.tr/~amostafazadeh/** and follow the link **Teaching** and then **Math 450**.

Topics to be covered: Newtonian and Hamiltonian formulation of classical Mechanics; physical bases for Quantum Mechanics; Finite-dimensional inner product spaces and a finite-dimensional model for Quantum Mechanics; Hilbert spaces, self-adjoint operators, and von Neumann's formulation of Quantum Mechanics; Relation to classical mechanics and canonical quantization; One-dimensional motion: Free particle, harmonic oscillator, general interaction potentials, scattering*; Three-dimensional motion: Angular momentum, representations of the rotation group*, the hydrogen atom; Perturbation theory*.

* Will be covered depending on the progress of the class.

Attendance & Bonus: Students are advised to attend all the lectures. n bonus points will be added to the grade in Midterm Exam 2, if the student attends n+15 lectures.

Evaluation method: Students' progress will be evaluated according to their performance in two midterm exams. Midterm Exam 1 will be given during the week of March 23, 2015 and will contribute as 35% to the total grade in this course. Midterm Exam 2 will be given during the week of May 18 and contribute as 65%. Each midterm exam will include at least one of the suggested homework problems.

Make-up: Students who miss one or both of the midterm exams and have a valid excuse (i.e., a medical report of an official memo from one of the deans explaining their situation) will be given a make-up exam on Monday May 25.

Auditing Students: In order to get an AU, a student must attend at least 20 lectures.

Suggested Method of Study: Students are advised to study the subjects covered in class immediately after the lectures. Reading the lecture notes and the textbooks is necessary for grasping the subject, but it is by no means sufficient. Students must try to reproduce all the results derived in class and work out the suggested homework problems. They are expected to spend an average of four hours per week on studying the material covered in class in addition to the time needed for working out the suggested exercises.