PHYSICS 5300
Applied Quantum Mechanics (Spring 2013)

Schedule: TT, 11:00-12:20 in Sci 204
Instructor: Mahdi Sanati, m.sanati@ttu.edu
Office and office hours: Sci 46, open door policy

Course Objectives and Coverage: Applied Quantum Mechanics course is intended for upper-level undergraduate and beginning graduate students in physics , applied physics, engineering, mathematics, chemistry, and biology, who are intending to understand and apply quantum mechanics to various physical and engineering problems. In this course students will learn the fundamentals of quantum mechanics, and applications of quantum mechanics to applied physics and engineering problems. As the technology is rapidly moving toward the nano-scale dimension (nanotechnology), classical physics fails to describe quantum phenomena observed in nanotechnology. Today, quantum mechanics have been the foundations of many applications in the fields of engineering, biology, chemistry, and others. Applications in the fields of engineering have included photonics, semiconductor lasers, semiconductor optoelectronic devices, resonant tunneling diodes, semiconductor transistors, quantum optics, and many other important novel applications that truly utilize quantum phenomena in their operation principles.

Expected Learning Outcomes: After completing this course students should (1) have a working knowledge of the foundations, techniques and key results of quantum mechanics; (2) be able to comprehend their basic applications at the research level, e.g., in research articles; (3) be able to read any other related quantum mechanics material as they need it.
Text: "*Quantum Mechanics, an introduction for device physicists and electrical engineers*", by D. Ferry, Second Edition. We will follow the material from the textbook, but departures from it occur frequently. Therefore, I encourage you to take notes.
Learning Assessment: Certain problems on the exams will explicitly require facility with the course objectives and be used as learning assessments tools.
Homework: Problem sets are assigned for each chapter. Part of these problems will be used in your exams. The grades on your exams reflect how well you can do the homework problems on your own.
Exams: three midterm exams (25% each), final exam (25%)
Grades: 100-A-88, 87.9-B-76, 75.9-C-64, 63.9-D-50, 49.9-F-0
Attendance: Required, except for excused emergencies. Each recorded absence counts as –5% and will be deducted from the course total.
Disability: Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office in 335 West Hall or 806-742-2405.