

**Instructors:** Dr. Bao-An Li  
**Office:** Science 142; Phone 903-886-5478  
**Email:** [Bao-An.Li@tamuc.edu](mailto:Bao-An.Li@tamuc.edu)  
**Office Hours:** TR 1:00am-4:00pm or by appointment  
**Text:** *Introduction to Quantum Mechanics*, 2nd ed., David J. Griffiths,  
ISBN 0-13-111892-7

**Catalog Description:** PHYS 420. *Introduction to Wave Mechanics*  
3 semester hours

The development of Schrödinger's Equation of non-relativistic wave mechanics and its application to simple systems.

**Main Contents:**

1. Origins of Quantum Mechanics, Complex Numbers & Linear Operators, Uncertainty Principle
2. The Schrodinger Equation, Applications of One-dimensional Time-independent Schrodinger Equation,
3. Angular Momentum and Spin
4. Three-dimensional Quantum Mechanics and Applications to Hydrogen-like Atoms
5. Time-independent Perturbation Theory and Applications
6. Time-dependent Perturbation Theory and Scattering Theory

**Student Learning Outcomes:**

1. Students will have a basic understanding of the historical development, philosophies and concepts of quantum mechanics
2. Students will understand the meaning of wave functions and the techniques of normalizing them
3. Students will have a good grasp of techniques in solving time-independent Schrodinger equation for simple one-dimensional potentials
4. Students will understand the concept of angular momentum and the techniques for manipulating angular momentum operators
5. Students will understand the uncertainty principle and apply it
6. Students will understand properties of hydrogen-like atoms using three-dimensional quantum mechanics
7. Students will have a good grasp of time-independent perturbation theory and its applications in understanding physics phenomena
8. Students will have a good grasp of time-dependent perturbation theory and its applications in solving simple scattering problems

### **Grading:**

Home works	40%
Exams	60%

### **Grade Scale:**

90 and above	--	A
80 to 90	--	B
70 to 80	--	C
60 to 70	--	D
below 60	--	F

### **Homework:**

Homework will be assigned regularly and it may be discussed in class. The homework counts 40% towards the final grade. **Students must do their own homework while discussions with others are strongly encouraged.**

### **Exams:**

There are totally three exams with equal weight, and they all will have an in-class component. At the instructor's discretion, a take-home component may also be assigned in order to test the students on more difficult or time-consuming problems. **Students must do their own work on any take-home components of exams.** The exact dates of the exams will be announced in class at least 1 week before each exam.

### **Cheating, Plagiarism, and other Breaches of Academic Conduct:**

Academic cheating, plagiarism, and other forms of academic misconduct may result in removal of the student from class with a failing grade or may in extreme cases result in suspension or expulsion from the University as described in the "Code of Student Conduct" section of the *Student's Guidebook*.

### **Classroom Behavior:**

Disorderly conduct which interferes with the normal classroom atmosphere will not be tolerated. The classroom instructor is the judge of such behavior and may instruct a disorderly student to leave the room with an unexcused absence or, in more serious situations, a student may be removed from the class with a failing grade. **All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See Student's Guide Handbook, Policies and Procedures, Conduct)**

### **Attendance and Tardiness:**

*Students are expected to be on-time and present for all class meetings.* Excused absences can be arranged prior to the class period being missed for appropriate activities as determined by the instructor. If an **emergency** results in an absence, the student should contact the instructor **as soon as possible** informing the instructor of the emergency and inquiring about ways to make up the missed class. The instructor will make judgments on how to handle the situation. Possible reasons for an excused absence are listed in the

*Student's Guidebook* under class attendance policy. A student who is tardy at the time roll is called may be marked absent.

**ADA Eligible Students:**

ADA eligible students should make arrangements with the instructor in the first week of the semester about special arrangements needed for classroom or testing facilities and procedures to accommodate the disability.

**Evaluation of Instruction:**

Students will be given opportunities to evaluate instruction near the end of the semester. The physics department utilizes a scantron-graded questionnaire with statements regarding various elements of instruction and in addition utilizes an open-ended form where students can make comments on all elements of the classroom. These comments are given to the instructor and department head soon after the grades are recorded. If students have concerns about the classroom experience during the semester they should inform the instructor of those concerns and failing a satisfactory response may, as a last resort, contact the physics department head with those concerns.