PHY373,
TTh 11-12:30, Fall 2016
Unique Number: 56345

- **Instructor:** Dr. Sonia Paban
  - **Office:** RLM 9.208A, 471-7773
  - **e-mail:** paban@physics.utexas.edu
  - **Class Website:** Canvas
  - **Office Hours:** Tuesdays 5-6 PM, Wednesday 3-4 PM or by appointment.
- **T.A.:**
  - **Office:**
  - **e-mail:**
  - **Office Hours:**
- **Prerequisites**: The following coursework with a grade of at least C- in each: Physics 336K, 353L, and 355 (or 453). In addition, M340L (Linear Algebra) is highly recommended.
- **Text:** *Introduction to Quantum Mechanics*, Second Edition by David J. Griffiths will be the main reference. Other useful references are:
  - *Principles of Quantum Mechanics* by R. Shankar
  - *Quantum Physics*, Michel Le Bellac
  - *Lectures on Quantum Mechanics*, Steve Weinberg
  - *Quantum Mechanics* by C. Cohen-Tannoudji, B. Diu and F. Laloe
  - *Quantum Mechanics, 2nd Edition* Richard Robinett
  - *An Introduction to Quantum Physics*, A.P. French and E.F. Taylor
  - *Quantum Mechanics, The Theoretical Minimum*, L. Susskind and A. Friedman
- This course carries the Quantitative Reasoning flag. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.
- **Weekly Classwork:**
  - **Homework:** There will be a total of 11 homework assignments.
    - **Problem set distribution:** Problem sets should be downloaded each week from Canvas.
    - **Due Date/Time:** Homework will be due on Thursday at the beginning of class.
    - **Late Homework:** No credit will be given to solutions submitted after the weekly deadline.
    - **Solutions:** Homework will be hand-graded and solutions to the homework problems will be available on the class web-page after the due date.

    - **Thoughts about homework:** Doing homework is very important for developing an understanding of the material and for developing problem solving skills. You may consult each other, but each student must complete his/her own work. The TA and I will hold weekly office hours. In addition, TAs are available at the coaching tables on the 5th floor of RLM.
  - **Concept Quizzes:** These are short, one question quizzes given periodically during most lectures. They will not count toward your grade except for evaluating participation and attendance. Their purpose is to involve you in the lecture, to help you develop scientific reasoning skills, and to monitor informally how well you are following basic concepts as they are introduced. They will familiarize you with the style of some questions in the exam. You should participate actively, guess intelligently when unsure and don't be afraid of making mistakes. Learning from your mistakes in the Concept Questions is the best way to avoid them in exams.
  - **Class Attendance and Participation:** It will be evaluated from Concept Questions and Reading Questions answer sheets.

- **Quizzes and Final Exam:** There will be midterms during class time on:
  - Thursday 10/6
  - Thursday 11/10

  A comprehensive final exam will be given on Monday, December 12, 2:00-5:00 pm. Makeup final examination will be given only in *documented* cases of illness or emergency.

- **Grading:** The grading policy is intended to compensate for the no-late-homework policy.

  Bonuses: Final Exam "over-ride": If your final score exceeds one or two of your best midterms, and if you have completed 8 homework assignments with a score of 50% or higher and have at least a 80% class attendance record, then your final exam will over-ride any midterms that are lower.

  The class-grade will be as follows:

Homework (the best 8 out of 11 grades)	(25%)
Class participation	(5%)
Midterms	(35%)
Final	(35%)

  Final grades will be determined by a class curve. Independent of the class curve, the following grades are guaranteed if you score at least as high as these cut-offs:

Letter Grade	Point Grade
A	94-100
A^-	90-93
B^+	86-89
B	82-85
B^-	78-81

Letter Grade	Point Grade
C^+	74-77
C	70-73
C^-	66-69
D^+	61-65
D	56-60
D^-	50-55

- **Notice to Students with Disabilities:** You may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Service for Students with Disabilities, 512-471-6259.
- **Use of e-mail for Official Correspondence with Students:** Changes will be posted on the class website and/or communicated through e-mail, following the University's official e-mail student notification policy. Students are responsible for keeping the University informed as to changes in their e-mail address. Instructions for updating your e-mail address are available here
- **Religious Holy Days:** By UT Austin Policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you miss a class, an examination or a homework in order to observe a religious holy day, I will give you an opportunity to complete the missed work within a reasonable time after the absence.
- **Academic Integrity:** The core values of the University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.
- **Campus Safety:**The following recommendations regarding emergency evacuation from the Office of Campus Safety and Security, 512-471-5767,
  - Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.
  - Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
  - Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.
  - In the event of an evacuation, follow the instruction of faculty or class instructors.
  - Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.
  - Behavior Concerns Advice Line (BCAL): 512-232-5050
  - Link to information regarding emergency evacuation routes and emergency procedures can be found here.
- **Final Comment:** I hope this class is inspiring and rewarding for you. If during the semester you have any suggestion for how I can improve the course, please let me know.

Syllabus for Quantum Physics I: Foundations
PHY373, Unique #56345
Fall 2016

Disclaimer: This calendar will be updated at the semester goes on.

Class	Date	Topic	Homework Assigned	Reading Chapter
1	8/25	Introduction. Double Slit Experiment.	1	Notes
2	8/30	Schrödinger Equation. Statistical Interpretation.		1 & Notes
3	9/1	Postulates of QM. Computations in CM vs. QM.	2	1
4	9/6	Momentum. Average Values. Uncertainty Principle.		1
5	9/8	Time Independent Schrödinger Equation. Stationary States	3	2
6	9/13	Infinite Square Well. Single Step Potential		2
7	9/15	Free Particle: wave packet evolution	4	2
8	9/20	Harmonic Oscillator		2
9	9/22	Generic Potential: Qualitative Analysis	5	Notes
10	9/27	The delta-function potential and barrier		2
11	9/29	The Path Integral Formulation of QM		Notes
12	10/4	Formalism of QM: Hilbert Space, Observables		3
13	10/6	Quiz 1	6	
14	10/11	Eigenstates of a Hermitian Operator		3
15	10/13	Uncertainty Principle. Applications.	7	3
16	10/18	Dirac Notation		3
17	10/20	Schrödinger Equation in 2D	8	Notes
18	10/25	Schrödinger Equation in 3D		4
19	10/27	Solution of Rotationally Invariant Problems	9	4
20	11/1	Angular Momentum		4
21	11/3	The Hydrogen Atom		4
22	11/8	Spin		4
23	11/10	Quiz 2	10	
24	11/15	Addition of Angular Momenta		4
25	11/17	Identical Particles. Pauli Exclusion Principle.	11	5
26	11/22	N particles in One Dimension.		5
	11/24	Thanksgiving		
27	11/29	Entangled States. Density Matrix		11 & Notes
28	12/1	EPR Paradox. Bell's Theorem		11