

# Quantum Mechanics II

## Physics 424

Department of Physics at Lehigh University

Fall 2014

*Instructor:* Gary G. DeLeo

*Office:* 412 Lewis Lab, 83413 (direct), 83931 (Physics office), lgd0 (e-mail)

*Text:* None assigned, but see reverse side for suggested references

*General Course Requirements:*

Requirements include: (i) reading assigned materials prior to class, (ii) attending all lectures, (iii) completing all homework problems on time, (iv) seeing the instructor if you are having trouble.

*Grading:*

Your numerical grade will be determined as follows:

Exam 1	35%
Exam 2	35%
Homework	20%
Attendance	10%
<b>TOTAL</b>	<b>100%</b>

*Tentative Topics:*

- Foundations of Quantum Mechanics (Review)
- Angular Momentum
- Perturbation Theory
- Many-Body Systems
- Applications to Many-Electron Atoms
- Vibrating Systems
- Symmetry and Group Theory
- Applications to Molecular Systems
- Applications to Solid State Systems
- Scattering Theory

***Accommodations for Students with Disabilities:*** If you have a disability for which you are or may be requesting accommodations, please contact both your instructor and the Office of Academic Support Services, University Center C212 (610-758-4152) as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.

***The Principles of Our Equitable Community:*** Lehigh University endorses *The Principles of Our Equitable Community* (<http://www4.lehigh.edu/diversity/principles>). We expect each member of this class to acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.

## **Textbooks and Reference Materials:**

### **General...**

- Concepts in Quantum Mechanics, V. S. Mathur and S. Singh, CRC Press (2009)
- Quantum Mechanics with Basic Field Theory, B. R. Desai, Cambridge (2009)
- Quantum Mechanics, 3rd ed., E. Merzbacher, Wiley (1998)
- Modern Quantum Mechanics, revised, J. J. Sakurai, Addison Wesley Longman (1994)
- Quantum Mechanics: The Theoretical Minimum, L. Susskind and A. Friedman, Basic Books (2014)
- Lectures on Quantum Mechanics, S. Weinberg, Cambridge (2013)
- Introduction to Quantum Mechanics, D. J. Griffiths, 2<sup>nd</sup> ed., Pearson (2005)
- A Modern Approach to Quantum Mechanics, J. S. Townsend, McGraw Hill (1992)
- Quantum Mechanics in a Nutshell, G. H. Mahan, Princeton (2009)
- Quantum Mechanics, C. Cohen-Tannoudji, B. Diu, and F. Laloe, Vols. 1 & 2, Wiley (1977, 2006)
- Quantum Mechanics, L. I. Schiff, McGraw Hill (1968)
- Quantum Mechanics (Two Volumes in One), A. Messiah, Dover (reprint 1999)
- Quantum Mechanics, K. T. Hecht, Springer (2000)
- Quantum Mechanics: A Modern Introduction, A. Das and A. C. Melissinos, Gordon and Breach (1986)

### **Atoms, Molecules, Symmetry...**

- Atoms and Molecules (Student Edition), M. Weisbluth, Academic Press (1978)
- The Theory of Atomic Spectra, E. U. Condon and G. H. Shortley, Cambridge (1935, 1951, 1970)
- Physics of Atoms and Molecules, B. H. Bransden and C. J. Joachain, Longman Group (1983, 1998)
- Atomic Spectra and Atomic Structure, G. Herzberg, Dover (1937, 1944)
- Quantum Theory of Atomic Structure, Vols. 1 & 2, J. C. Slater, McGraw Hill (1960)
- The Calculation of Atomic Structure, D. R. Hartree, Wiley (1957)
- Spectra of Atoms and Molecules, 2<sup>nd</sup> ed., P. Bernath, Oxford (2005)
- Elementary Theory of Angular Momentum, M. E. Rose, Dover (1957, 1995)
- Group Theory and Quantum Mechanics, M. Tinkham, McGraw Hill (1964)
- A collection of relevant texts is located in a special section of the Reading Room.*