

## Course Outline

**Text:** All reading assignments are from “Physical Chemistry: A Molecular Approach,” by D.A. McQuarrie and J.D. Simon

| <b>Topics</b>  | <b>Reading</b>                       |
|--|--------------------------------------|
| 1. The Need for Quantum Mechanics                              | Chapter 1                            |
| 2. The Classical Wave Equation                                 | Chapter 2                            |
| 3. The Schrödinger Equation & a Particle in a Box              | Chapter 3                            |
| 4. The Postulates of Quantum Mechanics                         | Chapter 4                            |
| 5. Introduction to Molecular Spectroscopy                      | Chapter 13.1<br>handout              |
| 6. Harmonic Oscillator and vibrational spectroscopy            | Chapter 5.1-5.7                      |
| 7. Rigid rotor and rotational spectroscopy                     | Chapter 5.8-9, 6.2-3                 |
| 8. Rotational – Vibrational spectroscopy of diatomic molecules | Chapter 13.2 – 13.4<br>13.11 – 13.13 |
| 9. The Hydrogen Atom   | Chapter 6                            |
| 10. Approximate Methods  | Chapter 7                            |
| 11. Many-Electron atoms  | Chapter 8.1-8.7                      |
| 12. Quantum States for Atoms and Atomic Spectroscopy           | Chapter 8.8-8.11                     |
| 13. Chemical Bonding and Diatomic Molecules                    | Chapter 9.1-9.10                     |
| 14. Nuclear Magnetic Resonance                                 | Chapter 14.1-3                       |