KJEM221 Fall-2017 – Preliminary reading list.

Primary textbook:

Peter Atkins and Ronald Friedman
Molecular Quantum Mechanics,
Oxford University Press
5th ed. (2010)

Including chapter	Excluding subchapter
1. THE FOUNDATIONS OF QUANTUM MECHANICS Operators in quantum mechanics The postulates of quantum mechanics The specification of evolution of states	Proof 1.4
2. LINEAR MOTION AND THE HARMONIC OSCILLATOR The characteristics of wave functions Translational motion Penetration into and through barriers Particle in a box The harmonic oscillator	The flux density (2.5) The Eckart potential barrier (2.9)
3. ROTATIONAL MOTION AND THE HYDROGEN ATOM Particle on a ring Particle on a sphere Particle in a Coulombic field	
4. ANGULAR MOMENTUM The angular momentum operators The definition of the states The angular momenta of composite systems	The coupling of several angular momenta (4.13)
5. GROUP THEORY The symmetries of objects The calculus of symmetry Reduced representations The symmetry properties of functions	Direct-product groups (5.15) The full rotation group (5.18, 5.19, 5.20)
6. TECHNIQUES OF APPROXIMATION Time-independent perturbation theory Variation theory Time-dependent perturbation theory	The semiclassical approximation. The Hellmann-Feynman theorem (p. 191/192). The Rabi formula (6.7(b)). The Einstein transition probabilities (6.10)

Also included in the curriculum are all exercises and problems discussed in class during the term.