

In 2014 the quantum mechanics course will be based on a book:

Mandl, Franz, Quantum Mechanics (Manchester Physics Series)

Curriculum:

Chapters 1.1-1.4, 2.1,2.3,2.5,2.6,2.7, 3.1-3.3, 4.1-4.4,
5.1-5.8, 6.1,6.3, 7.1-7.4, 8.1-8.3,
9.1-9.4, 10.1-10.2,11.1-11.3, 12.1-12.6

Curriculum & main themes:

Chap 0.

Setting quantum mechanics in a context:

1. Classical probability distributions.
2. Schroedinger equation vs Dirac equation vs Klein Gordon equation.
3. Recent Nobel Prizes in QM and what they were for.

Chap. 1

Basic principles, the state of the system. Operators & Functions and their properties
The Schroedinger equation

Chap. 2 simple example

One dimensional square well, angular momentum, central potentials,
momentum eigenstates, harmonic oscillator.

Chap. 3

Compatible observables, constants of motions, the uncertainty principle.

Chap. 4 symmetries and identical particles.

Chap. 5 angular momentum

Dirac notation, spin, spin and angular momentum addition, eigenvalues.

Chap. 6.

Applications of angular momentum.

Chapt 12.

Bra-Ket formalism & operators, vectors & matrix representation.
Harmonic Oscillator - II

Chapt 7.

Time independent perturbation theory in degenerate and non-degenerate case.
examples.

Chapt 8
The variational method.

Chapt 9
Time dependent perturbational theory.

Chapt 10.
Scattering, cross-section, potential scattering.

Chapt 11.
Scattering in time dependent approach, Born approximation.