

## 0.1 PH2201 : Basic Quantum Mechanics

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Credits: 3.0

### Syllabus

What necessitated a departure from classical mechanics and classical electrodynamics; The concept of wave function, Born's rule, normalization, superposition principle, Schrödinger equation, Postulates of quantum mechanics, operators and eigenvalues.

Particle-in-a-box problems: infinite square well, finite square well, and the harmonic oscillator well (using raising and lowering operator formalism).

Indeterminacy in quantum mechanics, calculation of probabilities and expectation values, Heisenberg's uncertainty principle.

Wave packets and motion in quantum mechanics, free particle wave packets, Scattering and tunneling.

Angular momentum, Stern-Gerlach experiment, orbital angular momentum, commutation relations and compatibility, Solution of 3D Schrödinger equation, the hydrogen atom.

### References

1. D. J. Griffiths, Introduction to Quantum Mechanics, Pearson Prentice Hall (2004)
2. Robert Scherrer, "Quantum Mechanics: An accessible introduction" Addison- Wesley (2006)
3. E. Merzbacher, "Quantum Mechanics" (Third Edition) Wiley (1997)