Main text: A. Polkovnikov, “Lecture Notes”.

Supplementary texts:
R. Shankar, “Quantum Mechanics”;
L. D. Landau, E. M. Lifshitz, “Quantum Mechanics”
E. Fermi, “Notes on Quantum Mechanics”
D. F. Walls, D.F. Milburn, “Quantum Optics”

Prerequisites: undergraduate level quantum mechanics, familiarity with basic programming using mathematica, matlab or python.

Grading: homeworks (weekly) 40%, midterm 25%, final 35%.

Topics covered
1) Review of classical Hamiltonian dynamics.
2) Quantum mechanics in Heisenberg representation. Uncertainty principle.
4) Examples of stationary states in one-dimensional systems. Harmonic oscillator.
5) Quantum mechanics in second quantized notations.
7) Perturbation theory.
8) Variational principle.
9) Stationary states in chaotic systems. Elements of random matrix theory.
10) Pure and mixed states. Measurements, entanglement, purification of mixed states.
11) Quantum mechanics in phase space. Wigner-Weyl quantization.
13) Non-adiabatic response and geometry of quantum systems.
14) Motion in fast oscillating field. Floquet theorem. Operator perturbation theory and Schrieffer-Wolff transformation..