Classical Mechanics

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This course will introduce the Lagrangian and Hamiltonian formulations of mechanics. These are valuable because (i) they facilitate the solution complex dynamical problems, (ii) they reveal a deep layer of structure in dynamical systems which is important in studies of the transition from order to chaos, and (iii) the provide the standard point of contact between classical and quantum theory.

Contents: the calculus of variations; principle of least action; Euler-Lagrange equations; applications to normal modes, strange coordinate systems, constrained systems; symmetries and Noether's theorem; Hamilton's equations; applications to harmonic oscillator, rotating coordinates, motion in an e.m. field; Liouville's theorem; Poisson brackets; connection between classical and quantum mechanics − phase-space operators, Hamilton-Jacobi equation, path integrals (if time allows).

Good references are *Mechanics* by Landau and Lifshitz (£19.99) and *Classical Mechanics* by Kibble (about £18).