– Master of Science Programme in Physics of Complex Systems –
Advanced Quantum Mechanics

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Aim of the course. The course aims to provide a thorough introduction to more advanced concepts of quantum mechanics and to discuss several applications of it.

Expected learning outcomes. The students will develop a deep understanding of a few special topics of advanced nature: the propagator and the formulation of quantum mechanics with the Feynman path integral; identical particles; particles in periodic potentials and band structure in solids.

Prerequisites. Some prerequisites of QM (see the topics of the course *Introduction to Quantum Mechanics*) are indispensable.

Delivery modes. Frontal lectures, including problems sessions on several applications of quantum mechanics.

Assessment and grading criteria. The examination will be based on 1 written test and an oral test. The final mark is provided by the average of the written (50%) and oral (50%) parts.

Suggested references. (1) J. J. Sakurai, *Modern Quantum Mechanics* (Addison-Wesley); (2) R. Shankar, *Principles of Quantum Mechanics* (Plenum Press); (3) P. A. M. Dirac, *The Principles of Quantum Mechanics* (Oxford University Press); (4) L. E. Picasso, *Lectures in Quantum Mechanics* (Springer International Publishing); (5) E. d'Emilio, L. E. Picasso, *Problems in Quantum Mechanics: with Solutions* (Springer International Publishing).

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