

## “Hard Skills” courses of the Ph.D. in Physics

**(\*) Topic Macro-area**

1 = Experimental Physics of Matter

2 = Theoretical Physics of Matter

3 = Physics of Complex Systems

4 = High energy Physics

INT = Interdisciplinary

**(\*\*) Frequency**

A = every year

B1 = every second year, on even/odd academic years (i.e. in 2022/2023, 2024/2025,...)

B2 = every second year, on odd/even academic years (i.e. in 2023/2024, 2025/2026,...)

CODE	COURSE TITLE	TEACHER	MACRO-AREA (*)	FREQUENCY (**)	HOURS
01UHYKG	Biological and vehicular traffic: stochastic models	Alessandro Pelizzola	3	A	20
02MLIKG	Corso seminariale del dottorato di ricerca in fisica	Renato Gonnelli & R.lotti	INT	A	25
01TSFKG	Scanning probe microscopy for physics and engineering	Renato Gonnelli	1	A	30
01RPVKG	Plasma physics	Francesco Porcelli	4	A	30
01GNKKG	Computational Methods in Optics	Emiliano Descrovi	1	A	20
01GLEKG	Quantum Nanophotonics	Emiliano Descrovi	1	A	20
01TSGKG	The Monte Carlo method	Fausto Rossi	INT	A	30
01QCOKG	Introduction to quantum optics and quantum technologies	Marco Genovese	1	A	25
01SZPKG	Introduction to electron microscopy	Angelica Chiodoni	1	A	23

CODE	COURSE TITLE	TEACHER	MACRO-AREA (*)	FREQUENCY (**)	HOURS
01HXIKG	Introduction to topological materials	Francesco Buccheri	2	A	21
01HWIKG	Physics of electrified interfaces	Michele Re Fiorentin	2	A	15
01TRUKG	Coherent-state approach to quantum systems	Vittorio Penna	2	B1	20
01TSHKG	High energy nuclear astrophysics	Andrea Lavagno	4	B1	20
01TSCKG	Elements of field theory	Laura Andrianopoli	INT	B1	30
02MLUKG	Fisica della superconduttività	Giovanni Ummarino	2	B1	20
05AXEKG	Surfaces physics	Giancarlo Cicero	1	B1	15
01MLTKG	Group Theory and some of its applications	Mario Trigiante	INT	B1	20
01TSEKG	Quantum Physics at the mesoscale	Fabrizio Dolcini	2	B1	21
01MLRKG	Nonextensive statistical mechanics	Antonio Scarfone	3	B1	10
01ROOKG	Introduction to belief propagation	Marco Pretti	3	B2	10
01NBTKG	Introduction to computation biology	Andrea Pagnani	3	B2	20
01MLOKG	Quantum mechanics of many-body systems	Vittorio Penna	INT	B2	30
01QCNKG	Electronic properties of graphene	Fabrizio Dolcini	2	B2	20
01QCTKG	Introduction to the Hamiltonian formulation of classical and quantum systems	Franceco Raffa	INT	B2	20
01DNRKG	Computational Materials Science	Giancarlo Cicero	2	B2	30
01HWAKG	Topology and Solid State Physics	Giovanni Ummarino	2	B2	20
01GLIKG	Quantum Fluids	Vittorio Penna	2	22/23 and 23/24	20