Curriculum Supervisor:

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Condensed matter physics: Theory and experiment

	Course	ECTS	yr	sem	SSD
1	Relativistic Quantum Mechanics	6	1	1	FIS/02
2	Condensed Matter Physics	6	1	1	FIS/03
3	Physics Laboratory I (propaedeutic to Phys. Lab. II)	6	1	1	FIS/01
4	Physics Laboratory II	9	1	2	FIS/01
5	Solid State Physics	6	1	2	FIS/03
6	English Language	4	1	2	
7	Elective (within group A)	6	1/2	1/2	
8	Elective (within group B)	6	1/2	1/2	FIS/03
9	Elective (within group B)	6	1/2	1/2	FIS/03
10	Elective (within group C)	6	1/2	1/2	
11	Elective (within group C)	6	1/2	1/2	
12	Elective (free choice)	6	1	2	
13	Elective (free choice)	6	2	1	
14	Internship	3	2	1	
15	Thesis Project	38	2	2	

Group A

1	Statistical Mechanics and Critical Phenomena	6	1	1	FIS/02
2	Many Body Physics	6	1	2	FIS/03

Group B

1	Soft and Biological Matter	6	1	1	FIS/03
2	Nonlinear and Quantum Optics	6	1	1	FIS/03
3	Many Body Physics	6	1	2	FIS/03
4	Photonics	6	1	2	FIS/03
5	Physics of liquids	6	1	2	FIS/03
6	Physics of Complex Systems	6	2	1	FIS/03
7	Spectroscopy Methods and Nanophotonics	6	2	1	FIS/03
8	Superconductivity and Superfluidity	6	2	1	FIS/03
9	Surface Physics and Nanostructures	6	2	1	FIS/03

NB: 12 ECTS = 12 CFU = 2 “non FIS” courses are required

	Group C	ECTS	yr	sem	SSD
1	Atomistic Simulations	6	1	1	INF/01
2	Computational Biophysics	6	1	1	INF/01
3	Computing Methods for Physics	6	1	1	INF/01
4	Machine learning*	6	1	1	INF/01
5	Nonlinear and Quantum Optics	6	1	1	FIS/03
6	Soft and Biological Matter	6	1	1	FIS/03
7	Statistical Mechanics and Critical Phenomena	6	1	1	FIS/02
8	Biophysics	6	1	2	FIS/03
9	Computational Statistical Mechanics	6	1	2	FIS/02
10	Computer architecture for Physics	6	1	2	INF/01
11	Deep Learning and applied artificial intelligence*	6	1	2	INF/01
12	Many Body Physics	6	1	2	FIS/03
13	Mathematical Physics	6	1	2	MAT/07
14	Neural Networks	6	1	2	FIS/02
15	Nonlinear waves and solitons	6	1	2	FIS/02
16	Photonics	6	1	2	FIS/03
17	Physics of liquids	6	1	2	FIS/03
18	Quantum Field Theory	6	2	1	FIS/02
19	Statistical Mechanics of Disordered Systems	6	2	1	FIS/02
20	Theoretical Biophysics	6	1	2	FIS/02
21	Medical Applications of Physics	6	2	1	FIS/01
22	Molecular Biology	6	1	2	BIO/11
23	Physics of Complex Systems	6	2	1	FIS/03
24	Quantum Information and Computation	6	2	1	FIS/01
25	Spectroscopy Methods and Nanophotonics	6	2	1	FIS/03
26	Superconductivity and Superfluidity	6	2	1	FIS/03
27	Surface Physics and Nanostructures	6	2	1	FIS/03

*borrowed from the MSc Computer Science curriculum

	Course	ECTS	yr	sem	SSD
1	Relativistic Quantum Mechanics	6	1	1	FIS/02
2	Condensed Matter Physics	6	1	1	FIS/03
3	Physics Laboratory I (propaedeutic to Phys. Lab. II)	6	1	1	FIS/01
4	Physics Laboratory II	9	1	2	FIS/01
5	Solid State Physics	6	1	2	FIS/03
6	English Language	4	1	2	
7	Elective (within group A)	6	1/2	1/2	
8	Elective (within group B)	6	1/2	1/2	FIS/03
9	Elective (within group B)	6	1/2	1/2	FIS/03
10	Elective (within group C)	6	1/2	1/2	
11	Elective (within group C)	6	1/2	1/2	
12	Elective (free choice)	6	1	2	
13	Elective (free choice)	6	2	1	
14	Internship	3	2	1	
15	Thesis Project	38	2	2	

NB: 12 ECTS = 12 CFU = 2 “non FIS” courses are required

	Group A	ECTS	yr	sem	SSD
1	Statistical Mechanics and Critical Phenomena	6	1	1	FIS/02
2	Many Body Physics	6	1	2	FIS/03

	Group B				
1	Soft and Biological Matter	6	1	1	FIS/03
2	Nonlinear and Quantum Optics	6	1	1	FIS/03
3	Many Body Physics	6	1	2	FIS/03
4	Photonics	6	1	2	FIS/03
5	Physics of liquids	6	1	2	FIS/03
6	Physics of Complex Systems	6	2	1	FIS/03
7	Spectroscopy Methods and Nanophotonics	6	2	1	FIS/03
8	Superconductivity and Superfluidity	6	2	1	FIS/03
9	Surface Physics and Nanostructures	6	2	1	FIS/03

	Group C	ECTS	yr	sem	SSD
1	Atomistic Simulations	6	1	1	INF/01
2	Computational Biophysics	6	1	1	INF/01
3	Computing Methods for Physics	6	1	1	INF/01
4	Machine learning*	6	1	1	INF/01
5	Nonlinear and Quantum Optics	6	1	1	FIS/03
6	Soft and Biological Matter	6	1	1	FIS/03
7	Statistical Mechanics and Critical Phenomena	6	1	1	FIS/02
8	Biophysics	6	1	2	FIS/03
9	Computational Statistical Mechanics	6	1	2	FIS/02
10	Computer architecture for Physics	6	1	2	INF/01
11	Deep Learning and applied artificial intelligence*	6	1	2	INF/01
12	Many Body Physics	6	1	2	FIS/03
13	Mathematical Physics	6	1	2	MAT/07

*borrowed from the Msc Computer Science curriculum

	Group C	ECTS	yr	sem	SSD
14	Neural Networks	6	1	2	FIS/02
15	Nonlinear waves and solitons	6	1	2	FIS/02
16	Photonics	6	1	2	FIS/03
17	Physics of liquids	6	1	2	FIS/03
18	Quantum Field Theory	6	2	1	FIS/02
19	Statistical Mechanics of Disordered Systems	6	2	1	FIS/02
20	Theoretical Biophysics	6	1	2	FIS/02
21	Medical Applications of Physics	6	2	1	FIS/01
22	Molecular Biology	6	1	2	BIO/11
23	Physics of Complex Systems	6	2	1	FIS/03
24	Quantum Information and Computation	6	2	1	FIS/01
25	Spectroscopy Methods and Nanophotonics	6	2	1	FIS/03
26	Superconductivity and Superfluidity	6	2	1	FIS/03
27	Surface Physics and Nanostructures	6	2	1	FIS/03

Superconductivity, strongly correlated systems, functional materials

	1st semester	2nd semester
1st year	Relativistic Quantum Mechanics Condensed Matter Physics Physics Laboratory I Computing methods for physics (C-Inf) One among: Atomistic Simulations (C-inf); Stat. mech. and Critical Phenom. (C); Nonlinear and Quantum Optics (C), Machine learning (C-inf)	Physics Lab II Solid State Physics English Language Many Body Physics (A) One among: Mathematical Physics (C-mat); Photonics (C); Physics of liquids (C); Deep Learning and applied AI (C-inf); another non-FIS exam of group C
2nd year	Superconducitvity and Superfluidity (B) One between: Surface Physics and Nanostructures (B); Spectr. methods and nanophotonics (B) One among: Surface Physics and Nanostructures (C); Spectr. methods and nanophotonics (C); Quantum Inform. and Computation (C); Solid State Sensors (elective free choice); another non-FIS exam Internship	Thesis project

Surface Physics and Nanostructures

	1st semester	2nd semester
1st year	Relativistic Quantum Mechanics Condensed Matter Physics Physics Laboratory I Computing methods for physics (C-Inf) One among: Atomistic Simulations (C-inf); Stat. mech. and Critical Phenom. (C); Nonlinear and Quantum Optics (C), Machine learning (C-inf)	Physics Lab II Solid State Physics English Language Many Body Physics (A) One among: Mathematical Physics (C-mat); Photonics (C); Physics of liquids (C); another non-FIS exam of group C
2nd year	Surface Physics and Nanostructures (B) Spectr. methods and nanophotonics (B) One among: Superconducitvity and Superfluidity (C); Quantum Inform. and Computation (C); Solid State Sensors (elective free choice); another non-FIS exam Internship	Thesis project

Photonics and Quantum Technologies

	1st semester	2nd semester
1st year	Relativistic Quantum Mechanics Condensed Matter Physics Physics Laboratory I Nonlinear and Quantum Optics (B) Computing methods for physics (C-Inf)	Physics Lab II Solid State Physics English Language Many Body Physics (A) Photonics (C)
in addition	One among: Nonlinear waves and solitons (1st yr, 2nd sem); Surface Physics and Nanostructures (B) (2nd yr, 1st sem); Spectr. methods and nanophotonics (B) (2nd yr, 1st sem); Solid State Sensors (elective free-choice) One elective free-choice non-FIS	
2nd year	Quantum Inform. and Computation (C)	Thesis project

Disordered systems: liquid, glassy, and soft matter

	1st semester	2nd semester
1st year	Relativistic Quantum Mechanics Condensed Matter Physics Physics Laboratory I Soft and Biological Matter (B) Stat. Mech. and Critical Phenom. (C)	Physics Lab II Solid State Physics English Language Many Body Physics (A) Physics of Liquids (B) Biophysics (C) One between: Deep Learning and applied AI (C-inf) another non-FIS exam of group C
2nd year	Atomistic Simulations (free elective choice) One between: Stat. Mech. of Disordered Systems (free elective choice); Introduz. Teoria dei Processi Stocastici ed Applicazioni (free elective choice) Internship	Thesis project

Complexity

	1st semester	2nd semester
1st year	Relativistic Quantum Mechanics Condensed Matter Physics Physics Laboratory I Machine learning (C-inf) Stat. Mech. and Critical Phenom. (C)	Physics Lab II Solid State Physics English Language Meccanica Statistica del Non Equilibrio (free elective choice) Deep Learning and applied AI (C-inf)
2nd year	Physics of Complex Systems Superconducitvity and Superfluidity (B) Introduz. Teoria dei Processi Stocastici ed Applicazioni (free elective choice) Internship	Thesis project