

UNIVERSITY OF BOLOGNA 2nd cycle Degree Programme in PHYSICS - curr:MANO				
	year	semester	Study plan	ECTS
<b>Compulsory Activities</b>	1	1	Symmetries, electrons and phonons	6
	1	1	Laboratory of Condensed matter physics	6
	1	1	Statistical Mechanics	6
	1	2	Software and Computing for Applied Physics	6

<b>Group of Choice 01</b>			1 course between:	6
	1	1	Microscopic Kinetics and Thermodynamics	
	1	1	Magnetism and Superconductivity	
			3 courses among:	18
	1	2	Charge Transport and Optics in Condensed Matter	
	1	2	Interactions and Correlations in Condensed matter	
	1	2	Laboratory of Nanoscience and Nanotechnology	
	1	2	Materials Modelling and Design	

<b>Group of Choice 02</b>			1 course between:	6
	1	1	Quantum science and technologies	
	1	1	X-rays and electrons for nanoscale analysis of matter	
			1 course between:	6
	1	2	Computational Material physics	
	1	2	Semiconductor materials and nanostructures	

<b>Group of Choice 03</b>	1	1 or 2	Type B activity - 6 ECTS chosen in one of the following sectors: FIS/01, FIS/02, FIS/03, FIS/07, FIS/08	6
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<b>Compulsory Activities</b>	2	1	Transversal skills for Physics-related professions	6
	2	2	Advanced professional and research skills in Physical Sciences	6

<b>Free choice Learning Activities</b>	2	1	Free Choice Learning Activities	12
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<b>Final Examination</b>	2	2	Preparation for the final examination - 18 ECTS	30
			FINAL EXAMINATION - 12 ECTS	

120

SORBONNE UNIVERSITE				
year	semester	M1+M2 study plan degree course	ECTS	
1	1	Quantum Mechanics (MU4PYA01)	6	
1	1	Numerical methods for physics (MU4PYA03)	6	
1	1	Statistical Physics (MU4PYA02)	6	
1	2	Atom and molecular physics (MU4PYA10)	6	

1	1	Macroscopic and complex systems (MU4PY04)	6	
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1	2	Condensed matter (MU4PYA11) + Nuclear and particle physics (MU4PYA08) + Physique Expérimentale II 3 ECTS (MU4PY207) + Project 3ECTS (MU4PYA12)	18	
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1	2	Astrophysics and cosmology (MU4PYA09)	6	
		1 course between:	6	
2	1	Computational Materials Sciences - CMS (MU5PYM14)		
2	1	Surfaces, interfaces and nanostructures SURF (MU5PYM07)		

		2 Courses among:	6	
2	1	Condensend Matter Chemistry (CMC)- 3 ECTS (MU5PYM04)		
2	1	Condensed Matter Physics 2 (CMP2) - 3 ECTS (MU5PYM02)		
2	1	Condensed Matter Physics 3 (CMP3) - 3 ECTS (MU5PYM03)		

		2 Courses of 3 ECTS or 1 of 6 ECTS among:	6	
1	1	Physique Expérimentale I - 3 ECTS (MU4PY107)		
1 or 2	1	Français Langue étrangère (FLE) - 3 ECTS (MU4PYA06)		
1	1	Professional Development (MU4PYA05)/ Orientation et Insertion Professionnelle - OIP (MU4PYIO1) - 3 ECTS		
1	1	International Physics Tournament (IPT) - 3 ECTS (MU4PY116)		
2	1	Knowledge Enhancement in Materials Science (KEMS3) - 3 ECTS		
2	1	Interdisciplinarité et Matériaux du Patrimoine - 6 ECTS (MU5CI012)		
		1 Course among:	6	
2	1	Non-crystalline solids and nanomineralogy -NOCNAM (MU5PYM13)		
2	1	Physics of materials under extreme conditions - PMX (MU5PYM12)		
2	1	Materials Investigation Methods: experiments and modelling - MIM (MU5PYM05)		
2	1	Knowledge Enhancement in Materials Science - KEMS6 - 6 ECTS		

		2 Courses among:	12	
2	1	Nanostructures for electronics and spintronics - OptoSpin (MU5PYM09)		
2	1	Advanced Condensed Matter Physics - Adv-CMP (MU5PYM11)		
2	1	Practical works: laboratories and simulations - LabS (MU5PYM06)		
2	1	Nanoelectronics and devices with molecules and nanoparticles - NanoElec (MU5PYM08)		

2	2	Internship (4,5 months min + Report + Defence)	30	
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120