



M.Sc. in Physics – Full list of courses by curriculum, A.Y. 2021/2022

Curriculum <i>Theoretical and Computational Physics</i>								
Year	Name of the course	Hours	ECTS	SSD	Term	Notes	✓	
First year	B - Distinctive courses (Corsi caratterizzanti)		42					
	<i>Mandatory courses</i>							
		Advanced quantum mechanics	48	6	FIS/02	I		
		Quantum field theory	48	6	FIS/02	I		
		Statistical mechanics and phase transitions	48	6	FIS/02	II		
		Quantum physics of matter	48	6	FIS/03	I		
	<i>Choose three courses among</i>							
		Physics of semiconductors	48	6	FIS/03	II		<input type="checkbox"/>
		Laboratory of quantum simulation of materials	60	6	FIS/03	I II		<input type="checkbox"/>
		Nanoscience & Quantum materials	48	6	FIS/03	II		<input type="checkbox"/>
		Quantum many-body theory	36	6	FIS/03	II		<input type="checkbox"/>
		Elementary particles	48	6	FIS/04	I		<input type="checkbox"/>
	C - Related courses (Corsi affini)		18					
	<i>Choose three courses among</i>							
		Advanced quantum field theory	48	6	FIS/02	II		<input type="checkbox"/>
		Relativity	48	6	FIS/02	II		<input type="checkbox"/>
		Quantum information processing	48	6	FIS/02	I		<input type="checkbox"/>
		Atomistic simulation methods	48	6	FIS/02	I		<input type="checkbox"/>
	Chemical physics of biomolecules	36	6	FIS/07	I		<input type="checkbox"/>	
	Physics education: theoretical and experimental methods	36	6	FIS/08	II		<input type="checkbox"/>	
	High-Performance-Computing	48	6	NG-INF/05	II	M.Sc. in Comp. Science – IT	<input type="checkbox"/>	
	Machine learning and deep learning	48	6	ING-INF/05	I	M.Sc. in Comp. Sc. Eng.	<input type="checkbox"/>	
	Complex systems	42	6	INF/01	II	M.S. in Computer Science	<input type="checkbox"/>	
Second year	B - Distinctive courses (Corsi caratterizzanti)		6					
	<i>Choose one course among</i>							
		Laboratory of condensed matter physics	60	6	FIS/01	I II		<input type="checkbox"/>
		Synchrotron radiation: basics and applications	48	6	FIS/01	I		<input type="checkbox"/>
	D - Free choice courses (Corsi a scelta libera)		12					
	<i>Choose at least 12 ECTSs among all courses (of any curriculum), or any other course offered at UNIMORE</i>							
	E - Thesis project and dissertation		36					
	F - Professional preparation (Corsi professionalizzanti)		6					
	<i>Choose 6 ECTSs among</i>							
		Good practices in research	3			I		<input type="checkbox"/>
	Research integrity in sciences	3			I		<input type="checkbox"/>	
	Science-based innovation	6				Attendance of CBI/SUGAR Unimore projects (see https://clab.unimore.it/)	<input type="checkbox"/>	
	High-performance-computing in sciences	3				Attendance of CINECA HPC courses (see https://eventi.cineca.it/en/hpc/catalogue)	<input type="checkbox"/>	



Curriculum *Experimental Nano-physics and Quantum Technologies*

Year	Name of the course	Hours	ECTS	SSD	Term	Notes	✓	
B - Distinctive courses (Corsi caratterizzanti)				42				
<i>Mandatory courses</i>								
	Laboratory of condensed matter physics	60	6	FIS/01	I II			
	Magnetism, spintronics and quantum technologies	48	6	FIS/01	II			
	Laboratory of nanofabrication	48	6	FIS/01	I			
	Synchrotron radiation: basics and applications	48	6	FIS/01	I			
<i>Choose three courses among</i>								
	Physics of semiconductors	48	6	FIS/03	II		<input type="checkbox"/>	
	Elementary particles	48	6	FIS/04	I		<input type="checkbox"/>	
	Nanoscience and quantum materials	48	6	FIS/03	II		<input type="checkbox"/>	
	Laboratory of quantum simulation of materials	60	6	FIS/03	I II		<input type="checkbox"/>	
	Quantum physics of matter	48	6	FIS/03	I		<input type="checkbox"/>	
C - Related courses (Corsi affini)				18				
<i>Choose three courses among</i>								
	Laboratory of electron microscopy and holography	48	6	FIS/01	I		<input type="checkbox"/>	
	Nano-mechanics	48	6	FIS/01	I		<input type="checkbox"/>	
	Statistical mechanics and phase transitions	48	6	FIS/02	II		<input type="checkbox"/>	
	Advanced quantum mechanics	48	6	FIS/02	I			
	Physics education: theoretical and experimental methods	36	6	FIS/08	II		<input type="checkbox"/>	
	Numerical algorithms for signal and image processing	36	6	MAT/08	II	M.Sc in Mathematics - IT	<input type="checkbox"/>	
	Machine learning and deep learning	48	6	ING-INF/05	I	M.Sc. in Comp. Sc. Eng.	<input type="checkbox"/>	
	Photonics & microwaves	54	6	ING-INF/02	ii	M.Sc in Electronic Eng.	<input type="checkbox"/>	
Second year	B - Distinctive courses (Corsi caratterizzanti)				6			
	<i>Choose one course among</i>							
		Quantum field theory	48	6	FIS/02	I		<input type="checkbox"/>
		Quantum information processing	48	6	FIS/02	I		<input type="checkbox"/>
		Atomistic simulation methods	48	6	FIS/02	I		<input type="checkbox"/>
	D - Free choice courses (Corsi a scelta libera)				12			
	<i>Choose at least 12 ECTSs among all of the above courses, or any other course offered at UNIMORE</i>							
	E - Thesis project and dissertation				36			
	F - Professional preparation (Corsi professionalizzanti)				6			
	<i>Choose 6 ECTS among</i>							
	Good practices in research		3		I		<input type="checkbox"/>	
	Research integrity in sciences		3		I		<input type="checkbox"/>	
	Science-based innovation		6			Attendance of CBI/SUGAR Unimore projects (see https://clab.unimore.it/)	<input type="checkbox"/>	
	High-performance-computing in sciences		3			Attendance of CINECA HPC courses (see https://eventi.cineca.it/en/hpc/catalogue)	<input type="checkbox"/>	



Curriculum *Bio-physics and Applied Physics*

Year	Name of the course	Hours	SSD	Term	Notes	✓	
First year	B - Distinctive courses (Corsi caratterizzanti)		36				
	<i>Mandatory courses</i>						
	<i>There is no mandatory courses for this curriculum</i>						
	<i>Choose two courses among</i>						
		Laboratory of condensed matter physics	60	6	FIS/01	I II	<input type="checkbox"/>
		Laboratory of nanofabrication	48	6	FIS/01	I	<input type="checkbox"/>
		Magnetism, spintronics and quantum technologies	48	6	FIS/01	I	<input type="checkbox"/>
	<i>Choose four courses among</i>						
		Quantum physics of matter	48	6	FIS/03	I	<input type="checkbox"/>
		Physics of semiconductors	48	6	FIS/03	II	<input type="checkbox"/>
		Nanoscience and quantum materials	48	6	FIS/03	II	<input type="checkbox"/>
		Laboratory of quantum simulation of materials	60	6	FIS/03	I II	<input type="checkbox"/>
		Elementary particles	48	6	FIS/04	I	<input type="checkbox"/>
	C - Related courses (Corsi affini)		24				
	<i>Choose four courses among</i>						
		Nano-mechanics	48	6	FIS/01	I	<input type="checkbox"/>
		Laboratory of electron microscopy and holography	48	6	FIS/01	I	<input type="checkbox"/>
		Synchrotron radiation: basics and applications	48	6	FIS/01	I	<input type="checkbox"/>
	Biological physics with laboratory	60	6	FIS/07	I II	<input type="checkbox"/>	
	Chemical physics of biomolecules	36	6	FIS/07	I	<input type="checkbox"/>	
	Medical physics	48	6	FIS/07	II	<input type="checkbox"/>	
	Physics education: theoretical and experimental methods	36	6	FIS/08	II	<input type="checkbox"/>	
	High-Performance-Computing	48	6	NG-INF/05	II	M.Sc in Comp. Science – IT <input type="checkbox"/>	
	Numerical algorithms for signal and image processing	36	6	MAT/08	II	M.Sc in Mathematics - IT <input type="checkbox"/>	
	Machine learning and deep learning	48	6	INF-INF/05	I	M.Sc. in Comp. Sc. Eng <input type="checkbox"/>	
Second year	B - Distinctive courses (Corsi caratterizzanti)		6				
	<i>Choose one course among</i>						
		Statistical mechanics and phase transitions	48	6	FIS/02	II	<input type="checkbox"/>
		Atomistic simulation methods	48	6	FIS/02	I	<input type="checkbox"/>
	D - Free choice courses (Corsi a scelta libera)		12				
	<i>Choose At least 12 ECTSs among all of the above courses, or any other course offered at UNIMORE</i>						
	E - Thesis project and dissertation		36				
	F - Professional preparation (Corsi professionalizzanti)		6				
	<i>Choose 6 ECTSs among</i>						
		Good Practices in Research	3			I	<input type="checkbox"/>
	Research Integrity in Sciences	3			I	<input type="checkbox"/>	
	Science-based innovation	6				Attendance of CBI/SUGAR Unimore projects (see https://clab.unimore.it/) <input type="checkbox"/>	
	High-Performance-Computing in sciences	3				Attendance of CINECA HPC courses (see https://eventi.cineca.it/en/hpc/catalogue) <input type="checkbox"/>	