



## Curriculum *Theoretical and Computational Physics*

Year	Name of the course	Hours	ECTS	SSD	Term	Notes	✓	
First year	<b>B - Distinctive courses (Corsi caratterizzanti)</b>		<b>42</b>					
	<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>							
		Solid state physics	48	6	FIS/03	I		<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"/>
	<b>C - Related courses (Corsi affini)</b>		<b>18</b>					
	<i>Choose three courses among</i>							
		Advanced quantum field theory	48	6	FIS/02	II		<input type="checkbox"/>
		Relativity	48	6	FIS/02	I		<input type="checkbox"/>
		Astrophysics	48	6	FIS/05	II		<input type="checkbox"/>
		Theoretical astroparticle physics	48	6	FIS/02	II		<input type="checkbox"/>
		Quantum information processing	48	6	FIS/02	I		<input type="checkbox"/>
	Physics of semiconductors	48	6	FIS/03	II		<input type="checkbox"/>	
	Theory and simulation of excitations in materials	48	6	FIS/03	II		<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 for physical sciences	48	6	FIS/03	II		<input type="checkbox"/>	
	Machine learning for scientific applications	48	6	FIS/03	I		<input type="checkbox"/>	
Second year	<b>B - Distinctive courses (Corsi caratterizzanti)</b>		<b>6</b>					
	<i>Choose one course among</i>							
		Laboratory of nanostructures	60	6	FIS/01	I II		<input type="checkbox"/>
		Synchrotron radiation: basics and applications	48	6	FIS/01	I		<input type="checkbox"/>
	<b>D - Free choice courses (Corsi a scelta libera)</b>		<b>12</b>					
	Choose at least 12 ECTSs among all courses (of any curriculum), or any other course offered at UNIMORE							
	<b>E - Thesis project and dissertation</b>		<b>36</b>					
	<b>F - Professional preparation (Corsi professionalizzanti)</b>		<b>6</b>					
	<i>Choose 6 ECTSs among</i>							
		Good practices in research		3		I		<input type="checkbox"/>
	Physics and society		3		I		<input type="checkbox"/>	
	Science-based innovation		6	Attendance of CBI/SUGAR Unimore projects (see <a href="https://clab.unimore.it/">https://clab.unimore.it/</a> )			<input type="checkbox"/>	
	High-performance-computing in sciences		3	Attendance of CINECA HPC courses (see <a href="https://eventi.cineca.it/en/hpc/catalogue">https://eventi.cineca.it/en/hpc/catalogue</a> )			<input type="checkbox"/>	