COURSE OF STUDY Degree in Physics

ACADEMIC YEAR *2023-2024*

ACADEMIC SUBJECT Analytical Mechanics

General information	
Year of the course	*2*
Academic calendar	First week of March - Last week of May
Credits (CFU/ETCS):	8
SSD	*FIS/02*
Language	*Italian*
Mode of attendance	*Not mandatory*

Professor/ Lecturer	
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Department and address	
Virtual room	
Office Hours	On request

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
158	*48*	*30*	*80*
CFU/ETCS			
8	*6*	*2*	

Learning Objectives	Understanding lagrangian and Hamiltonian mechanics
Course prerequisites	General Physics

Teaching strategie	Lessons on the blackboard
Expected learning outcomes in terms of	
Knowledge and understanding on:	Understanding lagrangian and Hamiltonian mechanics
Applying knowledge and understanding on:	○ Application of lagrangian and Hamiltonian mechanics
Soft skills	• **Making informed judgments and choices** Ability to proceed autonomously in the study of lagrangian and hamiltonian systems • **Communicating knowledge and understanding** Ability to express the acquired knowledge properly • **Capacities to continue learning** ○ Ability to study independently from texts and scientific literature
Syllabus	
Content knowledge	1) Equations of motion, Generalized coordinates, Principle of minimum action, Principle of relativity of Galilei, Lagrange function of a free material point, Lagrange function of a system of material points 2) Conservation laws, Energy, Momentum, Centre of mass, Momentum, Mechanical similitude 3) Integration of

	equations of motion, One-dimensional motion, Reduced mass, Motion in a central field, Kepler problem 4) Particle collisions, Particle disintegration, Elastic particle shocks, Particle diffusion, Rutherford formula 5) Small oscillations, Free unidimensional oscillations, Forced oscillations, Oscillations of systems with multiple degrees of freedom, Damped oscillations, Forced oscillations in the presence of friction, Anarmonic oscillations. 6) Rigid bodies 7) Canonical equations
Texts and readings	L.D. Landau e E.M. Lifšits, Fisica Teorica I, Meccanica, Editori Riuniti
Notes, additional materials	Notes from the teacher
Repository	

Assessment	
Assessment methods	Written and oral test
Assessment criteria	Adequate comprehension and global knowledge of concepts and arguments described throughout the course.
Final exam and grading criteria	*Vote/30*
Further information	
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