COURSE OF STUDY Degree in Physics
ACADEMIC YEAR *2023-2024*
ACADEMIC SUBJECT Group Theory

General information	
Year of the course	*2*
Academic calendar	First week of March - Last week of May
Credits (CFU/ETCS):	3
SSD	*FIS/02*
Language	*Italian*
Mode of attendance	Preferred, Not compulsory

Professor/ Lecturer	
Name and Surname	Antonio Marrone
E-mail	antonio.marrone@uniba.it
Telephone	+39 080 5443463
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
93	*16*	*15*	*62*
CFU/ETCS			
3	*2*	*1*	

Learning Objectives	Understanding Group Theory
Course prerequisites	Basic Pysics and Mathematics knowledge

Teaching strategie	Lessons on the blackboard
Expected learning outcomes in terms of	
Knowledge and understanding on:	Understanding Group Theory
Applying knowledge and understanding on:	Application of Group Theory
Soft skills	• **Making informed judgments and choices** Ability to proceed autonomously in the study of Special Relativity • **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	Introduction to Symmetry in Physics; Groups and Representations Definitions and examples Group of Permutations Sn General properties of groups

	Conjugation classes Subgroups. Normal subgroups. Homomorphisms. Group representations Schur Lemmas. Orthogonality theorem. Characters. Character table. Direct product and decomposition Symmetric group Sn and its representations. Young tableaux. Irreps of SU(N) and Sn. Tensorial method. Lie groups. SO(2),SO(3) and SU(2). SU(N) Young tableaux. Lie Algebras Simple Lie Algebras. Killing form. Root quantization. Dynkin diagrams. Weights and representations.
Texts and readings	H.F. Jones, *Groups, Representations and Physics*, Taylor & Francis; 2 edition H. Georgi, *Lie Algebras In Particle Physics: from Isospin To Unified Theories* (Frontiers in Physics),Westview Press; 2 edition (October 22, 1999) F. Stancu, *Group Theory in Subnuclear Physics*, Oxford Studies in Nuclear Physics
Notes, additional materials	Notes from the teacher
Repository	

Assessment	
Assessment methods	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	
	.