

General information	
Academic subject	Interacting Quantum Fields
Degree course	Physics
Academic Year	1
European Credit Transfer and Accumulation System (ECTS)	6
Language	English
Academic calendar (starting and ending date)	First week of March - Last week of May
Attendance	Preferred, Not compulsory

Professor/ Lecturer	
Name and Surname	Antonio Marrone
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Department and address	
Virtual headquarters	
Tutoring (time and day)	On request

Syllabus	
Learning Objectives	Understanding the concept of interactions between fields
Course prerequisites	Free Quantum Field Theory and Mathematics knowledge
Contents	The S-Matrix expansion - Wick's Theorem – Feynman diagrams in configuration space - Feynman diagrams in momentum space - Feynman rules for QED – QED processes in lowest order – Bhabha scattering – Compton scattering – Scattering by an external field – Bremsstrahlung – The infrared divergence – The second-order radiative corrections – The photon self-energy – The electron self-energy – External line renormalization – The vertex modification – Regularization - Applications
Books and bibliography	F. Mandl, G. Shaw, Quantum Field Theory, Wiley; 2 edition Also J.D.Bjorken, S.D. Drell, Relativistic Quantum Fields, Mcgraw-Hill College
Additional materials	Sone notes of the teacher

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
	55		120
ECTS			
	6		
Teaching strategy		Lessons on the board	
Expected learning outcomes			
Knowledge and understanding on:	Understanding the concept of interactions between fields		
Applying knowledge and understanding on:	Implementation of a symmetry in physical models		

Soft skills	<ul style="list-style-type: none"> • <i>Making informed judgments and choices</i> Ability to proceed autonomously in the study of quantum field theories • <i>Communicating knowledge and understanding</i> Ability to express the acquired knowledge properly • <i>Capacities to continue learning</i> Ability to study independently from texts and scientific literature
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Assessment and feedback	
Methods of assessment	Oral test (100%)
Evaluation criteria	Adequate comprehension and global knowledge of concepts and arguments described throughout the course.
Criteria for assessment and attribution of the final mark	
Additional information	