

Basic/Essential Course Information	
Course title	Interacting Quantum Fields
Degree Course title	Physics
ECTS	6
Compulsory attendance	No
Course teaching language	ENGLISH

Teacher	Antonio Marrone	antonio.marrone@uniba.it
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ECTS Details	Disciplinary area/broad field:	SSD	ECTS
		FIS/02	6

Time management and teaching activity type	Period	Year	lesson type
	2nd semester	I	Lessons (55h)

Time management	Total hours	in-class/in-lab study hours	out-of-class study hours
	175	55	120

Course calendar	Starting date	Ending date
	First week of March	Fourth week of May

Syllabus	
Prerequisites	Free Quantum Field Theory and Mathematics knowledge
Expected learning outcomes (according to Dublin Descriptors)	<p>Knowledge and understanding: Understanding the concept of interactions between fields</p> <p>Applying knowledge and understanding: Implementation of field interactions in different physical models</p> <p>Making judgements: Ability to proceed autonomously in the study of quantum field theories</p> <p>Communication: Ability to express the acquired knowledge properly</p> <p>Lifelong learning skills: Ability to study independently from texts and scientific literature</p>
Course contents summary	Knowledge of basic concepts of Quantum Field Theories. Applications of this knowledge to physical models
detailed syllabus	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	F. Mandl, G. Shaw, <i>Quantum Field Theory</i> , Wiley; 2 edition Also J.D.Bjorken, S.D. Drell, <i>Relativistic Quantum Fields</i> , Mcgraw-Hill College
notes	
Teaching methods	Lessons on the board
Assessment % of final mark	Oral test (100%)
Evaluation criteria	Adequate comprehension and global knowledge of concepts and arguments described throughout the course.