

Course Description

Department of Mathematics

Nature of the course <input type="checkbox"/> required <input type="checkbox"/> elective		Area 麻煩老師勾選類別，或直接填寫 <u>數學物理</u> 。			
		<input type="checkbox"/> 代數與數論 <input type="checkbox"/> 分析 <input type="checkbox"/> 幾何與拓樸 <input type="checkbox"/> 計算與應用數學 <input type="checkbox"/> 機率 <input type="checkbox"/> 統計 <input type="checkbox"/> 離散數學 <input type="checkbox"/> 其他 <input type="checkbox"/> 論文研討、獨立研究			
Calculus <input type="checkbox"/> Calculus A <input type="checkbox"/> Calculus B					
Course number		Section number	免填	Number of credits	4
Course title	課程名稱： QUANTUM FIELDS AND STRINGS				
Instructor	教授： 莊武諺				

I. * Contents :

Quantum fields, Klein-Gordon fields, Dirac fields, quantum electrodynamics, renormalization, non-abelian gauge theory, anomaly, index theorem, nonperturbative aspects of QFT, supersymmetry, perturbative string theory, D-branes, string dualities, mirror symmetry.

II. Course prerequisite :

Perhaps some knowledge in quantum mechanics

III. * Reference material (textbook(s)) :

Peskin, Schroeder, An Introduction to Quantum Field Theory

Berline, Getzler, Vergne, Heat Kernels and Dirac Operators

Quantum Fields and Strings: A Course for Mathematicians, Volume I and II

Polchinski, String Theory

Luest, Theisen, Lectures on String Theory

Green, Schwarz, Witten, Superstring Theory

* **Grading scheme** : 請填寫各項計分之百分比，例如：期中 30% 期末 40% 作業 10% 報告 20%，總計 100%

50% Homework assignments

50% Presentation or term paper

IV. * Course Goal :

This course will be an introduction to quantum fields and strings, aiming to equip the course takers with a modern (but perhaps only modest) understanding of the researches going on in (string inspired) mathematical physics society.

The contents might include the following:

Quantum field theory: Klein-Gordon fields, Dirac fields, QED, renormalization, non-abelian gauge theory, anomaly, index theorem, instantons, solitons, other nonperturbative aspects of QFT, supersymmetry.

String theory: perturbative (super)string theory, D-branes, string dualities, mirror symmetry.

1. * 號為必填欄位

2. 大綱內容字數英文最少 200 字以上