PHYSICS 8011 QUANTUM FIELD THEORY I
Spring 2019 Syllabus

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Lectures:  MWF 12:20-13:10 in Tate 120
Office Hours:  MW 13:15-14:00 or by appt.
Graduate TA:  Dan Phan (Tate 201-03)

COURSE PREREQUISITE (REQUIRED)

Students enrolled in QFT I are expected to have previous exposure to second quantization and the basics of relativistic wave equations through completion of PHYS 8001 Advanced Quantum Mechanics.

COURSE OUTLINE & REQUIRED/RECOMMENDED TEXTS

The object of this course is to provide an introduction to relativistic quantum field theory, using quantum electrodynamics as an example, ending with radiative corrections in one-loop order, and in particular, the calculation of the lowest-order contribution to the electron anomalous magnetic moment. This will be done by covering, in succession, Chapters 2 through 10 of the required textbook “Quantum Field Theory, Second Edition” by F. Mandl and G. Shaw (John Wiley & Sons, 2010). This is available as an eBook from the University Libraries, although the typesetting of the equations leaves much to be desired. Time-permitting, elements of an introduction to general field theory methods (as covered in Chapter 12 of Mandl & Shaw) will also be covered.
Strongly **recommended** as a additional resources are (a) Tom Banks’ *“Modern Quantum Field Theory – A Concise Introduction”* (Cambridge University Press, 2008), and (b) F. Schwabl *“Advanced Quantum Mechanics”* (Springer), the textbook for PHYS 8001.

**GRADE DETERMINATION**

Your grade will be based solely on (typically bi-weekly) homework problem sets: There will be no mid-term or final. Homework will be due in class one week after it is assigned (unless explicit instructions to the contrary are given). A deduction of 10% will be assessed for each day a homework assignment is late – this is to keep you engaged and up-to-date and in fairness to the grader.

As always, while you are expected to turn in solutions to the problems on your own, engaged and active discussions of the material with other students are acceptable and indeed encouraged.

Based on the sum-total of your homework scores, your final letter grade will be assigned as follows, remembering that there is no A+ or D-:

- **A:** 900 – 1000
- **B:** 750 – 899
- **C:** 600 – 749
- **D:** 500 – 599
- **F:** 0 – 499