

PHY 610: Quantum Field Theory I

Spring 2018

Instructor: Patrick Meade

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Class Meeting Time and Location: TR 11:30-12:50 Frey 326

Office Hours: By appointment

Grader: Samuel Homiller (Samuel.homiller@stonybrook.edu)

Recommended Main Texts:

M. Srednicki, *Quantum Field Theory*, Cambridge University Press.

M. D. Schwartz, *Quantum Field Theory and the Standard Model*, Cambridge University Press.

There are numerous other QFT textbooks that we will draw on this semester, but these two texts give a modern picture of QFT and are complementary to one another.

Some Other Recommended Texts (there are more):

Banks *Modern Quantum Field Theory*

Itzykson & Zuber *Quantum Field Theory*

Peskin & Schroeder *Quantum Field Theory*

Sterman *Quantum Field Theory*

Shankar *Quantum Field Theory & Condensed Matter*

Weinberg *The Quantum Theory of Fields Vols I & II*

Zee *Quantum Field Theory in a Nutshell*

Course Outline: This course will introduce the methods of Quantum Field Theory. We will investigate the inevitability of QFT. Spin 0,1/2 and 1 particles. Symmetries. Canonical Quantization. Path Integral Formulation. Perturbation Theory and Feynman Diagrams. S-Matrix, Cross-Sections and Decays. Spinor-Helicity Formalism. Basics of Renormalization.

HW: HW assignments will be announced on blackboard throughout the semester. You may work together on them, but the work that you turn in must be your own.

Exams: There will be a midterm and a final exam. The midterm will be held in class on March 20th. The final exam is scheduled for 5/15 from 11:15 am-1:45 pm. The exams will be closed book, but you may bring a single formula sheet on 8.5"x11" paper filled out on one side to each exam.

Grading Policy: Your grade will be determined based on the higher of the following two grading schemes (Midterm 30%, HW 40%, Final 30%) or (Midterm 20%, HW 40%, Final 40%).

ACADEMIC INTEGRITY

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at

<http://www.stonybrook.edu/uaa/academicjudiciary/>

ELECTRONIC COMMUNICATION

Email to your University email account is an important way of communicating with you for this course. For most students the email address is 'firstname.lastname@stonybrook.edu', and the account can be accessed here: <http://www.stonybrook.edu/mycloud>. *It is your responsibility to read your email received at this account.*

For instructions about how to verify your University email address see this: <http://it.stonybrook.edu/help/kb/checking-or-changing-your-mail-forwarding-address-in-the-epo> . You can set up email forwarding using instructions here: <http://it.stonybrook.edu/help/kb/setting-up-mail-forwarding-in-google-mail> . If you choose to forward your University email to another account, we are not responsible for any undeliverable messages.

RELIGIOUS OBSERVANCES

See the policy statement regarding religious holidays at <http://www.stonybrook.edu/registrar/forms/RelHolPol%20081612%20cr.pdf> Students are expected to notify the course professors by email of their intention to take time out for religious observance. This should be done as soon as possible but definitely before the end of the 'add/drop' period. At that time they can discuss with the instructor(s) how they will be able to make up the work covered.

DISABILITIES

If you have a physical, psychiatric/emotional, medical or learning disability that may impact on your ability to carry out assigned course work, you should contact the staff in the Disability Support Services office [DSS], 632-6748/9. DSS will review your concerns and determine, with you, what accommodations are necessary and appropriate. All information and documentation of disability is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the website <http://www.sunysb.edu/ehs/fire/disabilities.shtml>

CRITICAL INCIDENT MANAGEMENT

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the University Police and the Office of University Community Standards any serious disruptive behavior that interrupts teaching, compromises the safety of the learning environment, and/or inhibits students' ability to learn. See more here: <http://www.stonybrook.edu/sb/behavior.shtml>