

PHY 611: Quantum Field Theory II

Fall 2020

Instructor: Patrick Meade

Email: patrick.meade@stonybrook.edu

Class Meeting Time and Location: This course will be delivered online with synchronous lectures on WF from 1-2:20 pm. The lectures will be given via Zoom, with the links to the appropriate Zoom meeting found on Blackboard.

Office Hours: Via appointment setup on Zoom

Grader: Josh Leeman (Joshua.leeman@stonybrook.edu)

Required Texts:

There is no explicitly required text for this course, but it will draw heavily from:

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

and

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

There are numerous other QFT textbooks that will be referenced this semester, including Peskin & Schroeder and Weinberg (Vol 1 & 2). However, the aim will be to make the course as self contained within the lectures as possible.

Course Outline: This course will be the continuation of QFTI taught in the spring by Prof. Zamolodchikov. The main topics covered will be introducing fermions and other representations, Abelian and Non-Abelian Gauge Theories (quantization, renormalization, ghosts, BRST symmetry), IR divergences, Chiral Gauge theories, Anomalies, Spontaneous breaking of global and gauge symmetries, and the

formulation of the Standard Model. If time permits, additional topics will be included such as On-shell amplitude techniques and recursion relations, background gauge field methods, Coleman-Weinberg potentials and EFTs.

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. It needs to be turned in via pdf through email to the grader and myself.

Exams: There will be a midterm and a final exam. Both exams will be in the form of a timed “take home” 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. In fact it will be the primary form of communication other than Blackboard. 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>