This syllabus serves to establish the rules of the course and provides a rough course outline. Note that some aspects may evolve as the quarter progresses.

**Course Description:** The purpose of this course is to understand QFT at loop level, and to extend the formalism to non-Abelian gauge bosons. In addition, we will cover a variety of special topics. This course is designed to be the last quarter of a full year sequence.

**Course Objectives:** students will develop knowledge of the following topics:

1. Renormalized perturbation theory
2. Renormalization group evolution
3. Non-Abelian gauge theory at loop level
4. Spontaneous symmetry breaking
5. Effective field theory
6. Special topics

**Prerequisite:** PHYS 634 QFT 1 and PHYS 665 QFT 2

**Credit Hours:** 4
Required Text: *QFT and the Standard Model*, 1st Edition

Supplementary Text: *QFT*, 1st Edition

Supplementary Text: *An Introduction to QFT*, 1st Edition


Grade Distribution:
- Homework assignments 85%
- Presentation (at the end of the quarter) 15%

Letter Grade Interpretation:

- **Mastery**: ≥ A-
  - All (or virtually all) assignments done correctly and turned in on-time.
  - Presentation is clear, organized, and questions are adequately addressed.

- **Pass**: ≥ B-
  - Solid attempt on virtually all assignments and turned in on-time.
  - Presentation is clear, organized, although questions posed some challenges.

- **Fail**: ≤ C+
  - Habitually late HW (one or more missed HW set) and/or several incorrect problems on several HW sets.
  - Presentation is unclear, not organized, and questions cannot be addressed.

General Course Policies

- This is a graduate course, so you are responsible for your own learning. If you want to learn QFT, expect to spend between 10-20 hours per week on this course. That includes reading, doing HW, chatting with me, the TA, and your classmates about the material, and doing your best to avoid being overwhelmingly confused.

- I will communicate with you by email. I will disseminate course material using Dropbox.

- Computers and tablets are discouraged. I will give you permission if you can convince me that you will use them such that you do not disturb your classmates.

- Please silence your cell phone and leave it in your pocket.

Graded Assignments

- This is a special topics graduate course. You are responsible for your own learning. Many solutions can be found online, but as with any subject in physics, you will not learn the material if you do not put some sweat into the course.

- HW will be assigned periodically. The due date will be clearly stated. It should be turned in at the beginning of class. Please be sure your work is legible and organized (no need to write on the back of paper, start a problem on a new page, etc.).

- 24 hour late policy: Late assignments will be accepted up to 24 hours late. You get one free late waver. Each additional late assignment results in a grade level reduction (A+ → A, etc.).

- I reserve the right to assign homework during dead week.

- Detailed instructions for the presentation assignment will be provided later.