

SI2410 - Quantum Field Theory

Course PM 2019

August 19, 2019

1 Course contact details

Course coordinator and examiner: Mattias Blennow (emb@kth.se)

Course homepage: The Course homepage is on Canvas. Make sure you have access to it as it will be used for handing in homework assignments.

2 Course literature

The course is based on:

- An Introduction To Quantum Field Theory, M.E. Peskin and D.V. Schröder.

Other recommended reading:

- Quantum Field Theory, L.S. Brown.
- Quantum Field Theory, F. Mandl and G. Shaw.
- Quantum Field Theory and the Standard Model, M.D. Schwarz.

3 Seminars

If the number of interested students is high enough, the course will be given in seminar form. During the seminars, students will discuss the subject based on the rehearsal questions found at the course home page.

Seminar dates will be available on the course home page once decided upon. An introductory meeting will be held in the beginning of Period 1, we will discuss the course syllabus, the administration of the course, and the times for the course seminars. Please see Canvas for information on the course date.

3.1 Reading instructions

The following material in Peskin–Schröder corresponds to what should be studied in order to answer the rehearsal questions:

Seminar	Material
1	All of chapter 9, 10.1-4
2	11.1-2, 12.1-3
3	15.1-2, 15.4, 16.1-2
4	16.3-7
5	All of chapter 17
6	All of chapter 20
7	21.1-2
8	Your solutions to the homework problems

This information is also given in the assignment page corresponding to each seminar in Canvas.

3.2 Seminar grading

The seminars act as part of the examination of the course. In the beginning of the seminar, the students will be given the opportunity to chose which questions they are prepared to initiate discussion on. The seminars will act as an oral exam (TEN1) and be graded according to the number of questions the student is willing to start a discussion on according to the following: 6=A, 5=B, 4=C, 3=D, 2=E, 1=Fx, 0=F. In order to obtain a given overall grade on the TEN1 part, the student has to obtain at least that grade in four of the seminars and have at least two other seminars with the grade below. The student to initiate discussion on each particular question will be randomized and failure to do so satisfactorily will result in grade F on the seminar in question.

If the course is given as a reading course, the seminars will be replaced by an oral exam. An oral exam remains an option for students who do not reach the required number of passing seminar grades.

4 Home assignments

During the course there will be two sets of home assignments. The completion of these is part of the examination of the course (INL1). The sets will be available on Canvas, where deadlines will also be posted.

The hand in assignments will be handed out in two sets and consist of 3 and 2 problems, respectively, which will each be awarded a grade A-F. In order to obtain a given overall grade on the INL1 part, a student must have been given that grade or higher on at least three of the problems and obtained at least the grade below on the other two. In addition, a passing grade (E or higher) must be obtained on all problems. The grade Fx will be given to students who have passing grades on 4 problems. This can be raised to an E through an oral exam.

4.1 Rules

- Solutions to the homework should be handed in in PDF format via the course Canvas page. They may be handwritten and scanned or prepared using a computer. They should be clearly readable and ordered in problem order.
- Start the solution to each problem on a new page.
- Motivate your solutions as well and as concisely as you can. A few clear and correct sentences are always better than several long and incoherent ones.
- Hand in your solutions on time! If you are somehow prevented from doing so for external reasons, inform the examiner of this as soon as possible.
- You are allowed to collaborate and discuss the problems with other students. However, *the solutions that you hand in have to be written by yourself and mirror your own understanding*. If this is in question due to similar solutions or other reasons, you may be asked by the examiner to motivate your answers before your solution is handed back.

4.2 Problem grading

Solutions to the problems will be individually graded according to the following scale:

Grade	Criteria
A	The student has presented solutions to all parts of the problem. The solutions are clearly motivated and correct. Minor obvious typos can be accepted.
B	The student has solved all or most of the problem correctly. Minor issues with missing motivation and computational errors can be accepted as long as they do not lead to physical inconsistencies. Faulty arguments and inconsistent results can be accepted only if the remainder of the solution is essentially flawless.
C	The student's solutions treat most of the problem and is largely correct but may contain computational errors and lack motivation of a few steps. Faulty arguments and inconsistent results can be accepted to a minor degree.
D	The student has demonstrated a basic understanding for all parts of the problem as well as the underlying concepts. The student has made significant progress towards a solution of a large part of the problem. Faulty arguments and inconsistent results can be accepted to a more extended degree as long as the basic idea is correct.
E	The student's homework demonstrates a basic understanding of the major issues and concepts treated in the problem. The student has attempted to make proper progress towards a solution to the problem.
F	None of the above apply. This includes unreadable solutions, blank solutions, and solutions containing what is basically just a repetition of the problem formulation.

5 Final grade

Both parts of the course are graded independently (TEN1 - seminars, INL1 - home assignments), see the separate pages. Your final grade will be determined based upon your result in the individual parts according to the following table:

	TEN1				
INL1	A	B	C	D	E
A	A	A	B	B	B
B	B	B	B	C	C
C	B	C	C	C	D
D	C	C	D	D	D
E	D	D	D	E	E

In order to pass the course and obtain a final mark, you will need to have a passing grade (E or higher) in both parts of the course.