

## Sensor and exam guidance – FYS4555 oral examination

At the oral exam, only the candidate, the subject coordinator, and a sensor are present. The candidate enters the room with the other two, they greet one another and get started.

In answering questions, the candidate chooses between writing on paper or on board. Using the board is usually practical, as it is then easier to make sure that both sensor and subject coordinator can follow easily. Approximately 40 minutes is allocated for each student. It is not allowed to bring textbook, notes, or electronic equipment.

The candidate draws a number corresponding to a set of questions/assignments. Each set consists of several questions which cover various aspects of the curriculum. The questions within a given topic usually follow a logical progression and are best answered in order. The questions usually do not include complicated and time-consuming calculations, but the student should be prepared to demonstrate technical skills by for example using Feynman rules to arrive to the matrix element of a given process. While there is not enough time for full calculations of cross sections and decay rates, the student may be asked to explain the main steps and demonstrate familiarity with such a calculation. The student may also be presented with some plots and/or equations and asked to explain the content. Simple considerations and simplifications/approximations, basic concepts, and analogies often lead to an acceptable answer.

The subject coordinator leads the examination, and a pleasant, positive atmosphere is sought after. The goal of the subject coordinator is to make the student appear as knowledgeable as possible, for example by asking additional questions to lead the student in the right direction when necessary, to ensure that the student is able to convey all relevant knowledge.

Ideally the student should answer the questions as much as possible independently. Occasionally the subject coordinator may intervene if the candidate tends to spend too much time on one theme, thus allowing for further questions to be addressed and other learning outcomes to be covered.

If the candidate cannot at all tackle the question set allocated, he/she may ask the subject coordinator to change to a different question set. This is not encouraged and in such cases the final grade will be affected by the candidate not answering the originally assigned set of questions. This may however give an occasion for the candidate to display some skills and knowledge, so this is a judgment the student has to make.

Although the subject coordinator leads the exam, the sensor is encouraged to ask supplementary questions or request additional clarification (as long as this does not take too much of the allocated time). This may be relevant if some part of the student's answer is not fully clear to the sensor.

The question sets typically cover two to three essential and varied parts of the curriculum. The curriculum covers chapter 1 to 15 in the textbook, relevant end-of-chapter problems listed on the course webpage, compulsory problem sets, and "handouts" available from the course webpage.

Along the way in the examination, notes are made concerning the quality of the answers the candidate has given (based on the grading characteristics below). Since the subject coordinator is often fully concentrated on the exam, it is mostly the sensor that takes notes.

The subject coordinator may also take notes. The notes will ensure that the grading discussion after the examination is as thorough as possible. The notes are kept after the exam is over.

## Grading criteria

Here, only a characteristic of grades A, C and E are given. The intermediate grades B and D are natural to use when the performance falls somewhere between the given characteristics.

### *Grade A is characterized by:*

The presentation shows that the candidate both masters the concepts, applications, and the technical apparatus and that he/she has a very good overview of the thematic relationships. Within the framework of the curriculum, the candidate appears to be able to discuss on equal footing with the examiner and sensor. The presentation and argumentation is clear, precise, and well organized with the correct use of professional terminology. Some minor inaccuracies may be allowed.

### *Grade C is characterized by:*

The candidate can explain the main features of most key concepts, applications, and arguments, but the presentation shows signs of lack of overview and/or independence. The answers are easy to understand, but may have some formal shortcomings.

### *Grade E is characterized by:*

The presentation shows that the candidate has knowledge of basic concepts, applications, and techniques from several parts of the course, but has difficulty describing arguments and contexts beyond the most basic. The presentation is largely understandable, but reveals clear mistakes and misunderstandings.