Universidad Zaragoza

Academic Year/course: 2022/23

39150 - High Energy Physics

Syllabus Information

Academic Year: 2022/23
Subject: 39150 - High Energy Physics
Faculty / School: 100 - Facultad de Ciencias
Degree: 577 - Joint Program in Physics and Mathematics
ECTS: 5.0
Year:
Semester: Second semester
Subject Type: Optional
Module:

1. General information

1.1. Aims of the course

The aims of the course are aligned with the following Sustainable Development Goals (SDGs):

- Goal 4: Quality Education
- Goal 5: Gender Equality
- Goal 10: Reducing Inequality

2. Learning goals

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

A continued assessment will take into account the autonomous work and study of the students throughout the course. It includes solving assignments, problems and questions during the course. The grade of the continued assessment will reflect the quality of the solutions to the proposed exercises as well as the active participation in the course.

At the end of the course there will be a final exam that includes questions and problems on the topics covered during the course. The maximum mark score is 10 points.

- If the mark of the final exam is smaller than 4 points, this will be the final mark of the course.
- If the mark of the final exam is larger or equal than 4 points, the final mark will be the weighted average of the continuous evaluation grade (with a 40% weight) and the mark of the final exam (with a weight of 60%).

A minimum of 5 points is neccesary to pass the course.

Single global exam.

The course has been planned for students who can regularly attend the classes given throughout the course and who are able to solve the exercises proposed regularly throughout the course. Alternatively, students may pass the course by means of a single global exam, the final exam, on a date established by the Faculty of Sciences.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. It favors the

understanding of the physics of elementary particles from a theoretical, phenomenological and experimental perspective. A wide range of teaching and learning tasks are implemented, such as theory sessions, sessions dedicated to the discussion and resolution of problems and assignments to be done individually or in groups.

Students are expected to participate actively in the class throughout the semester.

4.2. Learning tasks

This course is organized as follows:

- Lectures.
- Problems session.
- Assignments. Different assignments during the course to be done by each student (individually) or by small groups.

4.3. Syllabus

The course will address the following topics:

1. Introduction to particle physics. Relativistic kinematics. Interactions of particles. Cross sections and decay widths.
2. Experimental Methods: Detection of particles. Particle accelerators and detectors.
3. Classical Field Theory. Symmetries. Electrodynamics and gauge symmetries.
4. Feynman diagrams. Fundamental interactions.
5. Basic notions of the weak, electroweak and strong interactions.

4.4. Course planning and calendar

Classes: 4 hours per week.

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the "Facultad de Ciencias" website.

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=39150