

## 1. Curricular Unit

Advanced Physics Topics 1

### Module

Experimental Particle and Astroparticle Physics , Advanced Analysis Methods, Top quark physics, Standard model and beyond (EPAP)

### Type

Lecture course

### Contact hours

20 (12 T, 8 p)

### Professor/Researcher in charge

Antonio Onofre, Nuno Castro, U. Minho

### Summary of Contents

This course involves the study of advanced analysis methods for PhD students within the field of Particle Physics. Following a theoretical revision on the current status of top quark physics, several applications are discussed. During the course, students are expected to be able to perform simple theoretical calculations related to top quark physics and explore the physics of its decay. The interplay between the top quark physics and the recently discovered Higgs boson is exercised as an application. Students are expected to analyse dedicated samples of ttH Monte Carlo events (with an hands-on approach). A production cross section limit at the LHC is extracted using advanced statistical tools.

### Evaluation

Students are expected to follow at least 2/3 of the lectures, in both topologies i.e., Theoretical (T) and Theoretical-Practical (TP). The grading plan involves attendance and participation in discussions, individual and team work as well as a final exam.

Coursework will be weighted as follows:

Attendance	10%
Individual/Team work	35%
Quizzes	25%
Final Exam	30%

### Jury

Antonio Onofre, Nuno Castro, Orfeu Bertolami