SCHOOL PLAN

University Unit:
Engineering school

Graduate program:
Geospatial Sciences and Applications

Curse:
☒ Academic Master ☐ Professional Master's ☒ Doctorate degree

Discipline :
Physics of Elementary Particles

Teacher (s):
Sérgio Szpigel

Note:

The Geospatial Science and Applications course is a multidisciplinary course encompassing research in Solar Physics, Terrestrial Solar Relations, Astronomy, Particle Physics and others. The course subjects reflect this multidisciplinarity and often require more than one teacher, who specializes in topics of the same discipline.

Workload:	**Credits**	☐ Required ☒ Optional ☐ Eleffective
48 h	4	

Description:

Historical review. The fundamental forces of Nature. Particle accelerators and detectors. Symmetries. Principles of invariance and conservation laws. Relativistic Kinematics. Cross section and decay rate. Quantum electrodynamics. Feynman rules. Møller, Bhabha and Compton scatterings. Electron-positron annihilation. Weak interactions. Standard Model of electroweak interactions. Spontaneous symmetry breaking and the Higgs boson. Structure of hadrons. Inelastic electron-nucleon scattering. Partons Model. Drell-Yan Process. Fragmentation of quarks and gluons. Quantum Chromodynamics. Extensions of the Standard Model.

Program content:

Evaluation criteria

According to the General Regulation of Stricto Sensu Post-Graduation, Art. 98:

A - excellent: corresponds to grades in the interval between grades 9 and 10;

B - good: corresponds to grades in the interval between grades 8 and 8.9;

C - regular: corresponds to grades in the interval between grades 7 and 7.9;

R - disapproved: corresponds to grades in the interval between degrees 0 and 6.9 "

Bibliography:

"Introduction to elementary particles", Griffiths, D., Second, Revised Edition, WILEY-VCH Verlag GmbH & Co. KGaA, 2008.

"Introduction to High Energy Physics", Perkins, D., Cambridge University Press, 2000.

"Quarks and leptons", Halzen, F. e Martin, A. D., John Wiley & Sons, 1984.

"Introduction to Elementary Particle Phenomenology" - Lecture Notes, Philip G. Ratcliffe, Dipartimento di Scienze e Alta Tecnologia Università degli Studi dell'Insubria in Como via Valleggio 11, 22100 Como (CO), Italy (philip.ratcliffe@uninsubria.it), 2014

"Elementary Particle Physics", V. 2: Foundations of the Standard Model, Yorikiyo Nagashima, WILEY-VCH Verlag GmbH & Co. KGaA, 2013.

"Particle Physics 1", - Lecture notes to the 1-st year master course, Nikhef - Autumn 2011, Marcel Merk (marcel.merk@nikhef.nl), 2011.

"Lessons in Particle Physics", Luis Anchordoqui and Francis Halzen, University of Wisconsin, arXiv:0906.1271v4 [physics.ed-ph] 13 Dec 2011.

Schedule

Date	Theme