

TEACHING GUIDE ON
DETECTOR PHYSICS

MASTER MODULE	SEMESTER	CREDITS	COURSE TYPE
Particle Physics and Astrophysics	1	6	Elective course
PROFESSOR(S)	CONTACT DETAILS		
- Sergio Navas Concha (part I) - Jorge Iglesias Páramo (part II)	Dpto. de Física Teórica y del Cosmos, Edificio Mecenaz (Planta Baja) despacho 28, Facultad de Ciencias – Universidad Granada Tel. 958 244152 e-mail: navas@ugr.es		
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	TUTORIALS TIMETABLE		
	Wednesday and Thursday: 14:00 – 17:00		
MASTER DEGREE			
University Master in Physics: Radiations, Nanotechnology, Particles and Astrophysics, University of Granada			
TEACHING DATES AND TIMES			
Monday: 15 h – 17 h Tuesday: 15 h – 16 h			
PRE-REQUISITES FOR REGISTRATION			
Degree in Physics. Basic knowledge on “Nuclear and Particle Physics” and “Astrophysics” is recommended.			
BRIEF CONTENTS DESCRIPTION			
This subject is about the physical basis of the detectors used in particle and astroparticle physics, and about the Innovative astronomical facilities.			



PROGRAM

Part I

- Lesson 1 Introduction to particle detectors: general characteristics.
- Lesson 2 Radiation passing through matter.
- Lesson 3 Gaseous detectors and scintillators.
- Lesson 4 Solid-state detectors.
- Lesson 5 Calorimeters.
- Lesson 6 Large facilities: cosmic radiation and collider detectors.

Part II

- Lesson 7 Electromagnetic spectrum. Physical processes governing the radiation of astronomical objects at different wavelength ranges.
- Lesson 8 Telescopes and astronomical facilities.
- Lesson 9 Basic concepts on astronomical instrumentation and detectors.
- Lesson 10 Data reduction of astronomical imaging data.
- Lesson 11 Data reduction of astronomical spectroscopic data.
- Lesson 12 Practicum I: visit and night observation at Calar Alto observatory (depending on Budget).

BIBLIOGRAPHY

- “Techniques for Nuclear and Particle Physics Experiments”, by W.R. Leo, ISBN 3-540-17386-2, Springer-Verlag.
- “Particle Detectors”, by C. Grupen, ISBN 0-521-55216-8, Cambridge University Press.
- “Radiation Detection and Measurement”, G.F. Knoll, ISBN : 978-1-118-02691-5, John Wiley & Sons.
- “Astrophysical Techniques”, by C.R. Kitchin, 5th edition, ISBN 978-1-4200-8243-2, CRC Press.
- “Observational Astrophysics”, by P. Lená, F. Lebrun & F. Mignard, 2nd edition, Springer 1998.

Recommended links:

- The Particle Adventure: <http://www.particleadventure.org/>
- CERN Summer Student Lectures: <https://cds.cern.ch/collection/Summer%20Student%20Lectures>
- The Review of Particle Physics (Particle Data Group): <http://pdg.web.cern.ch/pdg/>
- High-Energy Physics Literature Database (INSPIRE): <http://inspirehep.net/>
- SPIRES (Database): <http://www.slac.stanford.edu/spires/hep/>
- Bock & Krischer, The Particle Detector Briefbook: <http://rd11.web.cern.ch/RD11/rkb/titleD.html>
- Bock & Vasilescu, The Data Analysis Briefbook: <http://rkb.home.cern.ch/rkb/titleA.html>

