UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

DIPARTIMENTO INTERUNIVERSITARIO DI FISICA

General information	
Academic subject	Particle and Radiation Detector Laboratory
Degree course	Physics
Academic Year	II – first semester
European Credit Transfer and Accumulation System (ECTS)	6
Language	English
Academic calendar (starting and ending date)	September 19, 2022 – December 16, 2022
Attendance	Compulsory

Professor/ Lecturer	
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Department and address	Dipartimento di Fisica "M. Merlin", Stanza R74
Virtual headquarters (Microsoft Teams code)	-
Tutoring (time and day)	On request

Syllabus	
Learning Objectives	The student should learn how to operate various classes detectors and some data analysis techniques commonly used in high-energy physics
Course prerequisites	Basic knowledge of detector physics
Contents	Laboratory experiences with high-energy particle detectors: plastic and crystal scintillators, scintillating fibres, lead-glass calorimeters, silicon pixel detectors. Development of data analysis software using the C++ and/or python languages and the CERN ROOT toolkit.
Books and bibliography	Radiation Detection and Measurement, G. F. Knoll, ed. Wiley
Additional materials	Slides provided by the teacher

Work schedule			
Total	**Lectures**	**Hands on (Laboratory, working groups, seminars, field trips)**	**Out-of-class study hours/ Self-study hours**
Hours			
69	24	45	
ECTS			
6	3	3	

Teaching strategy	
	Lectures. Laboratory experiences. Hands-on data analysis sessions.

Expected learning outcomes	
Knowledge and understanding on:	• Interactions of particles and radiation with matter • Principles of operation of several classes of detectors • Strategies for data analysis
Applying knowledge and understanding on:	• Use of different types of detectors and implementation of appropriate experimental set-ups • Performing detector calibrations • Development of appropriate tools for data analysis
Soft skills	• Making informed judgments and choices ○ choice of appropriate detectors for different applications • Communicating knowledge and understanding ○ Writing lab reports and communicating scientific results ○ Team working abilities

	• Capacities to continue learning ○ Implementation of experimental techniques in high-energy physics

Assessment and feedback	
Methods of assessment	Laboratory reports and oral exam
Evaluation criteria	**Knowledge and understanding** • Principles of operation of the detectors used in the laboratory experiences • Implementation of experimental set-ups **Applying knowledge and understanding** • Analysis of the data taken in the laboratory experiences **Autonomy of judgment** • Interpretation of the experimental results **Communicating knowledge and understanding** • Ability of discussing experimental techniques **Communication skills** • Clarity and use of appropriate language **Capacities to continue learning** • Ability of developing data analysis tools
Criteria for assessment and attribution of the final mark	Lab reports (20%) and oral exam (80%)
Additional information	