

Primary Area of Specialization: Nuclear and Particle Physics

Identification number	Workload	Credits	Term of studying	Frequency of occurrence	Duration
MN-P-SP-Nuc	630 h	21 CP	1 st to 3 rd semester	Details are provided online in the table "Course Offerings".	3 semesters
1	Type of lessons	Contact times	Self-study times	Intended group size	
	a) Lecture	196 h	319 h	individual counseling for the seminar	
	b) Advanced Seminar	10 h	80 h		
	c) Exam	1 h	24 h		
2	Aims of the module and acquired skills				
	Understanding of the main concepts of nuclear and particle physics, including reaction theory and the physical principles of detectors and accelerators used in nuclear and particle physics.				
3	Contents of the module				
	The module is subdivided into core courses and specialized courses.				
	1. Core courses				
	<ul style="list-style-type: none"> • Nuclear Physics II (3 HPW, 4.5 CP): Study of nuclear reactions, fission and fusion. Accelerators. • Detector Physics (2 HPW, 3 CP) Interaction of radiation with matter, scintillators, semiconductor detectors, particle detectors. • Particle Physics (3 HPW, 4.5 CP): Introduction into particle physics 				
	2. Specialized courses				
	<ul style="list-style-type: none"> • Theoretical Nuclear Physics I (2 HPW, 3 CP) • Theoretical Nuclear Physics II (2 HPW, 3 CP) • Theoretical Nuclear Physics III (2 HPW, 3 CP) • Accelerator Mass Spectrometry (2 HPW, 3 CP) • Nuclear Astrophysics (2 HPW, 3 CP) • Neutron Physics (2 HPW, 3 CP) • Selected problems in Nuclear Structure (2 HPW, 3 CP) • Heavy Ion Physics (2 HPW, 3 CP) • Tools for Particle Physics (2 HPW, 3 CP) • Selected Topics on Future Energy Supply (2 HPW, 3 CP) • Applied Nuclear Physics (2 HPW, 3 CP) • and others, including fitting courses from Bonn University, if approved by the module coordinator 				
	3. Advanced Seminar in Nuclear and Particle Physics (2 HPW, 3 CP)				
	The contents of the specialized courses can be found in the "kommentiertes Vorlesungsverzeichnis" and in the lecture descriptions online.				

4	<p>Teaching/Learning methods</p> <p>Besides the teaching in lectures, the self-study based on books and lecture notes plays an important role. In discussions with others, they learn to solve challenging problems in a team and to present their approaches and results. By preparing an advanced seminar, they become acquainted with a current topic of research, scientific methods and literature. They also learn to communicate in a pedagogical way on an advanced topic.</p>
5	<p>Requirements for participation</p> <p>Nuclear and Particle Physics and Quantum Mechanics at the level of the bachelor courses in physics</p>
6	<p>Type of module examinations</p> <p>The module is passed by passing an oral examination covering the topics of the core courses. To be admitted to the exam, students must actively have participated in the specialized courses and have presented a scientific talk in the advanced seminar course. The grade given for the module is equal to the grade of the oral examination.</p>
7	<p>Requisites for the allocation of credits</p> <p>The Primary AoS Nuclear and Particle Physics is composed of:</p> <ol style="list-style-type: none"> 1. Three core courses (8 HPW, 12 CP) 2. Two specialized courses in Nuclear and Particle Physics (4 HPW, 6 CP) 3. Advanced Seminar in Nuclear and Particle Physics (3 CP)
8	<p>Compatibility with other Curricula and Soft Skills</p> <p>As elective subject in other M.Sc. programs.</p> <p>Scientific reading and presentation skills, in particular oral presentations.</p> <p>This module prepares for topics of current research in nuclear and particle physics and provides the basis for the preparation of the master thesis in nuclear and hadronic physics.</p>
9	<p>Significance of the module mark for the overall grade</p> <p>The weight of the module is $21/111 \approx 18.9\%$.</p>
10	<p>Module coordinator</p> <p>J. Jolie</p>
11	<p>Additional information</p> <p>Detailed information on the occurrence and the course contents are provided online and in the "kommentiertes Vorlesungsverzeichnis".</p> <p>Version: 05.06.2015 HK</p>