

Physics

Master of Science

1. Content of the degree programme

The ultimate goal of physics is to provide a comprehensive explanation of the inanimate aspects of nature on the basis of a small number of very general principles. Experimental observations and theoretical descriptions complement each other in physics.

It has close links to mathematics, as physicists make use of the language and findings of mathematics while issues in physics pose challenges that drive development in mathematical thinking. The methods used in physics provide examples and direction for other sciences. For this reason, physics is a subject with many connections to other disciplines. It plays a key role in technical advancement and basic research in physics has shaped our view of the world.

The Master's degree programme builds on the contents of the Bachelor's programme and is more research-orientated. The aim of the Master's degree programme is for students to gain academic skills that enable them to carry out independent research in physics and solve problems in engineering, economics and finance using the methods of physics. The Master of Science in Physics is equivalent to the Diplom previously awarded by German universities.

2. Structure of the degree programme

The degree programme lasts four semesters. The first two semesters make up the specialisation phase, which develops knowledge from the Bachelor's programme, and the following two semesters form the research phase. In the research phase, students continue to study specialisations and complete their Master's thesis. Students must complete modules from the compulsory subjects worth at least 90 ECTS credits. The modules are as follows:

- (a) at least one of the *Advanced experimental physics* modules
- (b) at least one of the *Advanced theoretical physics* modules
- (c) the modules *Advanced lab courses and projects 1* and *2*
- (d) the module *Specialisation phase*
- (e) the module *Project planning and preparation*
- (f) the module *Master's thesis*
- (g) the module *Master's colloquium*

Students must complete elective modules in physics and in non-physics subjects worth at least 20 ECTS credits. In the elective physics subjects, students choose areas they can specialise in. Students must successfully complete modules worth at least 10 ECTS credits, among them the module *Physics seminar*. In the elective non-physics subjects, students may acquire specialised knowledge in a physics-related subject of which they already have basic knowledge or basic knowledge in another physics-related subject. These modules may be chosen from those offered by the Faculty of Sciences (all subjects except physics) and the Faculty of Engineering, and modules on pre-clinical medicine. Other subjects may be permitted upon request. The remaining 10 ECTS credits must be completed with other modules that can be chosen from the entire range of elective physics and non-physics subjects.

The Master's degree programme is structured in such a way that it can be started in the summer semester or in the winter semester. As of the summer semester 2015, the Physics Master's degree programme is taught entirely in English. All courses are taught in English; examinations may be taken in German

upon request. For more information on the content, structure and orientation of the Physics Master's degree programme, see Appendix 1.

3. Specialisation 'Physics in Medicine'

The Master's degree programme may be studied with the specialisation 'Physics in Medicine'. For the elective physics subjects, students choose modules on physics in medicine instead of the modules PW and PS, while for the non-physics elective subjects they choose modules in computer science in medicine, the foundations of medicine, and materials in medicine. Suitable modules shall be shown as such in the module catalogue.

For the compulsory subjects, the modules WP-1 and WP-2 are replaced with *Advanced Laboratory Course in Physics in Medicine 1 (PEM-1)* and *Advanced Laboratory Course in Physics in Medicine 2 (PEM-2)*. The subject of the Master's thesis must belong to the subject area 'Physics in Medicine'. Graduates who have successfully completed the specialisation may have it indicated specifically on their Master's degree certificate upon request.

4. Admission requirements

The requirement for admission to the Master's degree programme is an undergraduate degree from a university. Applicants should have completed this degree with an overall grade of at least 2.5 or equivalent. English proficiency (level B2 CEFR) is required and may be proven through six years of English classes at a German secondary school (Gymnasium). Qualification or aptitude for the Master's degree programme is examined in the qualification assessment process (see examination regulations of the degree programme [2]). Applications for the Master's degree programme must be submitted to FAU's Master's Office online via [movein](#) and by post; the deadline is 15 July for the winter semester and 15 January for the summer semester [7].

5. Career prospects

Graduates know how to think analytically and work independently and methodically to approach and solve problems in a structured way. They possess in-depth knowledge of physics and, thanks to the elective subjects they have studied and core skills they have gained, they are able to take on positions of responsibility in interdisciplinary working groups. This makes them sought after candidates for many potential employers in various fields. They may pursue an academic career or work at companies that ensure they retain their competitive edge by hiring well trained and highly qualified professionals.

Most job opportunities can be found in research and development, although physicists are also in demand in other areas, such as management and consulting. Despite challenges in the job market, unemployment has remained comparatively low among physics graduates for some time.

After completing the Master's degree programme, graduates are eligible to start an academic career by pursuing doctoral studies in which they will refine and strengthen their research skills in their chosen field.

6. Addresses

Subject advisors

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7. More information online

- [1] Department of Physics website: www.physik.fau.de
- [2] Examination regulations of the degree programme: www.zuv.fau.de/universitaet/organisation/recht/studiensatzungen/NAT1/PO-Bachelor-MA-Physik-WS_Okt2014.pdf
- [3] Examinations Office: www.pruefungsamt.fau.de
- [4] Information for students transferring from other universities: www.fau.de/studium/vor-dem-studium/zugang-zum-studium/hochschulwechsel/
- [5] FAU course catalogue: www.vorlesungsverzeichnis.fau.de
- [6] Doctoral regulations: www.zuv.fau.de/universitaet/organisation/recht/studiensatzungen/nat.shtml#PromOHabO
- [7] Information on application for Master's degree programmes: www.master.fau.eu
- [8] List of Master's degree programmes: www.fau.eu/study/prospective-students/degree-programmes/masters-degree-programmes/

Appendix 1: Study Plan – Physics Master's degree programme

Module name	Abbreviation	ECTS	SWS ¹	Area ²	Weighting ³	Comments
1st semester^(a)						
Advanced experimental physics 1	EV-1	10	4L+3T	C	1	At least one of the modules EV-1 and EV-2 must be completed successfully.
Advanced lab courses and projects 1	WP-1	5	3P	C	1	
Advanced theoretical physics 1	TV-1	10	4L+3T	C	1	At least one of the modules TV-1 and TV-2 must be completed successfully.
Physics elective course	PW	5	2L+1T	E	1	At least 15 ECTS credits must be achieved in the modules PW and NW.
Physics elective course	PW	5	2L+1T	E	1	
Elective course (other than physics)	NW	5	2L+1T ^{b)}	E	1	At least 15 ECTS credits must be achieved in the modules PW and NW.
2nd semester						
Advanced experimental physics 2	EV-2	10	4L+3T	C	1	At least one of the modules EV-1 and EV-2 must be completed successfully.
Advanced lab courses and projects 2	WP-2	5	3P	C	1	
Advanced theoretical physics 2	TV-2	10	4L+3T	C	1	At least one of the modules TV-1 and TV-2 must be completed successfully.
Physics elective course	PW	5	2L+1T	E	1	At least 15 ECTS credits must be achieved in the modules PW and NW.
Physics seminar	PS	5	2S	E	1	Presentation time includes discussion
Elective course (other than physics)	NW	10	2L+1T	E	1	At least 15 ECTS credits must be achieved in the modules PW and NW.
3rd and 4th semester (research phase)						
Specialisation phase	FO-1	15	5P	C	0	Specialised study and literature research in intended subject of Master's thesis
Project planning and preparation	FO-2	15	5P	C	0	Work on assigned preparatory tasks
Master's thesis	FO-3	25		C	2	Work on scientific objective and thesis
Master's colloquium	FO-4	5		C	2	Public presentation of results of research phase with discussion

¹ SWS = semester hours per week, L = lecture, T = tutorial, P = laboratory/project, S = seminar

² C = compulsory subject, E = elective physics or non-physics subject

³ Weighting of the modules in the calculation of the Master's final grade. Weighting 0 means that the module in question does not count towards the final grade.

^(a) The semester hours per week for the modules PW and NW may vary. The value given is based on a typical average.