Please note that this document is a non-binding convenience translation. Only the German version of the document entitled "Prüfungsordnung der Universität Heidelberg für den Bachelor-Studiengang Physik", dated 25 January 2007, published in the President's bulletin (Mitteilungsblatt des Rektors) of 26 January 2007, p. 249, and last amended on 29 July 2015 [President's bulletin dated 28 August 2015] has legal validity.

HEIDELBERG UNIVERSITY EXAMINATION AND DEGREE PROGRAMME RULES AND REGULATIONS FOR THE BACHELOR'S DEGREE PROGRAMME IN PHYSICS

dated 25 January 2007

I. General information

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Section I. General information

§ 1 Purpose of the academic programme and examination

(1) The Bachelor's degree course Physics is organised by the Faculty of Physics and Astronomy. It conveys a broad overview of the subject as well as the academic basis and methods required for entering a profession in research, development and administration in the field of physics and, in particular, enables candidates to register for the consecutive postgraduate degree programme: Master of Science in Physics. Furthermore, the degree programme enables students to gain additional qualifications in other natural sciences, and in fields not associated with natural sciences. Students who wish to study in the higher secondary school (Gymnasium) teaching degree programme are provided with the opportunity of in-depth training according to the legislative decree passed by the Ministry of Education and Cultural Affairs on guidelines for the transition from general education teaching degree programmes to the consecutive degree programme structure with Bachelor's and Master's degrees in teacher training in Baden-Wuerttemberg at all universities of education, universities, universities of art and music, as well as Heidelberg's university of Jewish Studies.

(2) The purpose of the Bachelor's examination is to assess whether students have an overview of the interconnections between the individual disciplines, are able to apply academic methods and knowledge, and have acquired the specialist knowledge required to enter into a profession.

(3) Admission requirements to the academic programme are subject to separate admission regulations.

§ 2 Bachelor's degree

Heidelberg University, represented by the Faculty of Physics and Astronomy, awards the academic degree of "Bachelor of Science" (abbreviated: "B.Sc.").

§ 3 Standard period of study, programme structure and range of courses offered

(1) The standard period of study for the Bachelor's degree programme is six semesters, including examinations. Successful completion of the Bachelor's degree programme requires a total of 180 credit points (CP) in both compulsory and elective courses.

(2) The Bachelor's programme is a modular programme and includes both subject related studies (148 CPs) and interdisciplinary skills (20 CPs). 12 credit points are allocated for the Bachelor's thesis. All compulsory and compulsory elective modules, as well as the related courses, are listed in Attachments 1 to 3 - we highly recommend consulting the model syllabi (Attachment 5 and module

handbook) in order to structure the sequence of courses/modules. In addition, elective courses enable students to gain subject-specific and interdisciplinary qualifications.

(3) An orientation examination must be taken no later than at the end of the second semester. It is an integral part of the course and consists of the successful completion (pass) of the final examination for the module Experimental Physics 1 (PEP 1). In order to successfully complete (pass) the examination, the candidate requires a "sufficient" (4.0) grade or higher.

(4) If the candidate fails or is considered to not have passed the orientation examination, it may be retaken once during the following semester. If the orientation examination has not been passed by the end of the third semester, the student is not entitled to take the final examinations, unless the student is not responsible for exceeding the deadline.

(5) The orientation examination is a component of the Bachelor’s examination.

(6) Generally, the language of instruction and examinations is German. Lectures and courses may also be offered in English.

(7) There are 17 available credit points in the elective courses. These must be earned in one of the electives listed in Attachment 4. Upon application, the examinations board may approve a subject/elective not listed in the attachment.

(8) If the candidate does not fully complete the Bachelor's examination within a period of three semesters after expiry of the standard period of study, he/she loses the entitlement to take the examination unless the student is not responsible for exceeding the deadline.

§ 4 Modules, credit points and transcript of records

(1) A module is a learning and teaching unit, self-contained in terms of both time and content and comprised of different lectures and courses. Modules consist not only of lectures and courses, but also the examination prerequisites that are necessary for completion of the module.

(2) The Bachelor’s thesis is an individual module.

(3) Interdisciplinary skills are included as compulsory components in subject related studies (key skills) or offered in compulsory electives (see Attachment 3).

(4) All components within a sub-module must be graded as "sufficient" (4.0) or higher (=sub-module grades) in order to pass the module.

(5) Credits are given for successfully completed modules including their individual

components. One credit point corresponds to a 30-hour workload.

(6) Participation in a lecture or course may require previous successful participation in another lecture or course.

(7) A transcript of records will be issued at the end of each semester, listing all module examinations students have passed, including the corresponding credits and grades.

§ 5 Examinations board

(1) An examinations board organises examinations and tasks defined in these examination rules and regulations. The committee includes a head of the Physics Faculty, two lecturers of experimental and theoretical physics, a representative of the research assistants, and a representative of the student body; the student representative is only granted an advisory vote.

(2) The faculty appoints the chairperson, his/her deputy, the other members of the examinations board and their respective deputies. The chairperson and the deputy must be professors and/or lecturers. The examinations board student representative is appointed by the faculty council based on a proposal from the departmental student committee.

(3) The members are appointed for three years; the student member is appointed for one year. Each term begins on 01 October. Members may be re-elected.

(4) The examinations board ensures that the examination rules and regulations are upheld. On a regular basis, the committee reports to the faculty regarding changes to examinations, study periods and grading. This report is published in a suitable form.

(5) The chairperson manages everyday examinations board business, prepares and chairs meetings and, has the deciding vote in the event of a tied vote. The examinations board may confer further responsibilities to the chairperson.

(6) Examinations board members have the right to attend examinations.

(7) Members of the examinations board and their deputies are subject to official secrecy. Members who are not civil servants are sworn to secrecy by the chairperson.

§ 6 Examiners and observers

(1) Following consultation with the examinations board, the chairperson appoints the examiners for all examination components. Examiners must be lecturers in the Bachelor's degree programme in Physics.

(2) In general, examination components which are not completed during the course of study may only be set by professors, associate professors, lecturers, or research associates who have been granted examination rights by the Faculty following many years of successful teaching experience.

(3) In general, the lecturer for the respective lecture or course is responsible for examination components completed during the course of study.

(4) Observers must have taken the Bachelor's examination or at least an equivalent final examination.

(5) For examiners and observers, § 5 section 7 (official secrecy) shall apply accordingly.

§ 7 Recognition of study periods, examination prerequisites and examination results

(1) Completed examination prerequisites and results obtained at a domestic or foreign university or comparable institution are recognised provided that there is no significant difference in terms of acquired skills as defined by the module handbook.

(2) When recognising periods of study, as well as completed examination prerequisites and results obtained outside the Federal Republic of Germany, equivalency agreements and agreements between partner universities approved by the Conference of German Ministers of Education (Kultusministerkonferenz, KMK) and German Rectors' Conference (Hochschulrektorenkonferenz, HRK) must be taken into account.

(3) For study periods, completed examination prerequisites and results obtained at state-recognised distance learning institutions and other institutes of education, in particular universities of cooperative education (state or state-recognised), Paragraph 1 applies.

(4) If examination prerequisites and results are recognised, grades - insofar as grading systems are similar - must be transferred and included in the calculation of the overall grade in accordance with these examination rules and regulations. If grading systems are not comparable, examination prerequisites and results are graded as a "pass". This recognition can be indicated in the diploma. If more than 50 % of the examination components to be recognised are ungraded examination components completed during the course of study or examination components completed during the course of study using grading systems that are not comparable, the examinations board has to make the final decision.

(5) Relevant professional experience may be recognised.

(6) Qualifications not gained in university degree programmes are recognised according to § 32 of the Act on Higher Education of the Land of Baden-

Württemberg (LHG) provided that they adequately replace skills as defined in the module handbook.

(7) Decisions are made by the examinations board in accordance with Sections 1 to 6.

§ 8 Unexcused absences, withdrawal, deception and breaches of regulations

(1) An examination is considered "failed" (5.0) if candidates fail to appear to the examination without a valid reason for their absence, or if they withdraw after the examination has started. A written examination that was not concluded within the allocated time is also assigned a "failing grade", unless the candidate is not responsible for exceeding the deadline.

(2) Reasons for withdrawal or absence must be stated credibly and immediately to the examinations board in writing. If the candidate, or a child for whom the candidate is generally solely responsible, is ill, a medical certificate must be provided; in case of doubt, a medical certificate from a doctor, designated by the university, may be requested. If the reasons are accepted, a new appointment will be scheduled. In this case, examination results that are already available will be taken into account.

(3) When deciding whether the candidate is responsible for exceeding a registration or examination deadline, the examinations board must respect the provisions stated in the legislation on maternity leave and the legal regulations concerning parental leave. The same applies for students with family members who are in need of care as well as disabled and chronically ill students, according to § 7, Section 3 of the German legislation on leave for caregivers.

(4) If the candidate tries to influence the examination results by means of deception or by using unauthorised aids, the examination component in question will be graded as "failed" (5.0). If candidates disrupt the proper course of the examination, they may be excluded from further participation in the examination by the examiner or examination supervisor. In this case, the examination result will be graded as "failed" (5.0). In severe cases, the examinations board may exclude the candidate from all future examinations.

(5) The candidate may request a review of the decision by the examinations board in accordance with paragraph 4 sentences 1 and 2 within a period of fourteen days. The candidate must be informed of negative decisions immediately and in writing, stating the reasons and providing information on the legal appeals procedure.

§ 9 Types of examination components

(1) The examination components are:
1. oral examination components completed during the course of study

2. written examination components completed during the course of study
3. the Bachelor's thesis

(2) If candidates provide a medical certificate which credibly proves that they are not able to take examination components completely or partially in their intended form, due to long-term or permanent health problems, the examinations board may allow them to take an equivalent examination. The same applies for examination prerequisites.

§ 10 Oral examination components completed during the course of study

(1) In oral examination components, candidates are required show that they are able to identify interconnections within the subject of the examination and relate specific problems to these interconnections.

(2) An oral examination may last between 15 and 60 minutes.

(3) Students wishing to take a subject examination at a later examination date may be permitted to listen in on the same examination, if room is available. The audience may not attend assessment and announcement of the examination result. Listeners can be prohibited from attending upon the candidate's request or for other valid reasons.

§ 11 Written examination components completed during the course of study

(1) In written examination components, candidates are required to prove that they are able to recognise problems relating to their subject and find solutions for them, using subject-specific methods with limited time and resources.

(2) A written examination may last between 45 and 180 minutes.

(3) If a written examination component is set as a term paper, it must also be written under examination conditions. The candidate must therefore assure that he/she is the author of the work and has used no sources or aids other than those indicated.

(4) The evaluation period for written examination components should not exceed two weeks.

§ 12 Assessment of examination components

(1) Grades for the individual examination components are determined by the respective examiners. The following grades must be applied for assessment of examinations:

1 = very good = an outstanding performance;
2 = good = a performance which is substantially better than

average requirements;

3 = satisfactory = a performance which corresponds to average requirements;

4 = sufficient = a performance which, despite deficiencies, still meets the requirements;

5 = failed = a performance which does not meet the requirements due to considerable deficiencies.

For more detailed assessment of examination results, interim grades may be applied by increasing or decreasing the individual grades by 0.3; the grades 0.7, 4.3, 4.7 and 5.3 may not be applied.

(2) In general, the evaluation period for examination components should not exceed two weeks following completion of the module.

(3) Students receive a passing grade in an examination component if it has been graded as "sufficient" (4.0) or higher.

(4) When calculating final module grades and the overall examination grade (§17, section 3), only the first decimal after the point is taken into consideration. The other decimals are dropped without rounding.

(5) If grades are awarded in accordance with the European Credit Transfer System ECTS, the international assessment standard specified in Attachment 6 is applied.

(6) Individual modules may not require a grade; in these cases students can merely "pass" or "fail" the module. In these cases, the result is not included in the calculation of the overall grade. The modules in question are identified accordingly in the module handbook.

Section II: Bachelor’s examination

§ 13 Bachelor's examination admission requirements and procedure

(1) Admission to the individual examination components for the Bachelor's examination, defined in § 14 Section 1, is only possible for candidates who:

1. are enrolled in the Bachelor’s degree programme in Physics at Heidelberg University,
2. have not forfeited their entitlement to take the examination.

(2) For Bachelor’s thesis admission, additional certificates must be presented with proof of the following:
passed orientation examination,
evidence of successful participation in modules that cover examination prerequisites worth at least a total of 142 credit points.

(3) The application for presentation of the Bachelor's degree must be made in writing and addressed to the chairperson of the examinations board. The application must include:

1. Evidence of examination prerequisites totalling 180 credit points according to the catalogue of compulsory, compulsory elective and elective module in physics (Attachments 1 to 4) as well as of the successfully completed Bachelor's thesis;
2. a declaration stating whether the candidate has previously failed a Bachelor's examination or an intermediate Diploma examination in either Physics or in degree programmes with comparable content, or has previously failed the intermediate examination in the teaching degree programme Physics, or is currently participating in an examination procedure in one of the aforementioned degree programmes;
3. a declaration stating that the candidate has not lost his/her entitlement to take the final examinations in the Bachelor's degree programme in Physics.

(4) The chairperson of the examinations board makes the decision on the application. Rejections must be presented in writing, stating the reasons and providing information on the appeals procedure.

(5) If candidates are unable to provide such evidence, the examinations board may accept other proof.

(6) The application may only be denied if:

1. conditions are not fulfilled in accordance with Section 3, or
2. documents are not complete, or
3. the candidate has failed the final attempt at the Bachelor's examination, or the intermediate Diploma examination, or the final Diploma examination in either Physics or in degree programmes with comparable content, or has failed the intermediate Physics teaching degree programme examination or the Physics Teacher Education Examination for prospective higher secondary teachers (wiss. Prüfung für Lehramt Gymnasium), or
4. the candidate has lost his/her entitlement to take examinations in a degree programme according to No. 3 due to other reasons, or
5. the candidate is currently participating in an examination procedure in the Bachelor's degree programme in Physics, the Diploma degree programme in Physics or the teaching degree programme in Physics.

§ 14 Scope, nature and organisation of the Bachelor's examination

(1) The Bachelor's examination consists of:

examination components completed during the course of study in the modules, in accordance with Attachments 1 to 4
the Bachelor's thesis.

(2) Examinations, as referred to in Section 1, No. 1, are taken orally or in writing as an integrated part of the lecture or course. The lecturer responsible for a lecture or course determines the nature and duration of the examination components in accordance with Section 1, No. 1 and announces this information at the latest at the beginning of the lecture or course.

(3) Module examinations may consist of several sub-module examinations.

(4) Students may start writing their Bachelor's thesis once they have earned a total of 142 credit points.

(5) Compulsory, compulsory elective, and elective modules that have not yet been completed must be completed at the latest during the semester in which the candidate writes his/her Bachelor's thesis.

§ 15 Bachelor's thesis

(1) The Bachelor's thesis is an examination component that completes the academic programme. The purpose of the Bachelor's thesis is for candidates to show that they are able to work independently on a problem from the subject field of the degree programme in Physics, or other associated fields, within a given period of time and in accordance with the principles of scientific work.

(2) The Bachelor's thesis may be assigned and supervised by any authorised examiner in accordance with § 6, Sections 1 and 2.

(3) The candidate must start writing the Bachelor's thesis or apply for allocation of a Bachelor's thesis topic from the chairperson of the examinations board no later than at the beginning of the semester following the semester during which the final examination component (completed during the course of study) was concluded.

(4) If the deadline is not met, the final thesis will be graded as "failed" (5.0), unless the candidate is not at fault for exceeding the deadline.

(5) The topic of the Bachelor's thesis will be determined by the thesis supervisor in agreement with the candidate. If an application for assignment of a topic is submitted, the chairperson of the examinations board will ensure that the candidate receives a topic for his/her Bachelor's thesis in good time. The candidate must be allowed sufficient time to propose own topics. However, this does not constitute a legal entitlement to a certain topic. The chairperson of the examinations board assigns the thesis topic; the date of assignment must be recorded.

(6) The deadline for submission of the thesis is 12 weeks after topic assignment. In exceptional cases, the examinations board may extend this deadline by up to 2 weeks. If the deadline is exceeded, the Bachelor's thesis will be graded as

"failed" (5.0), unless the candidate is not responsible for exceeding the deadline.

(7) The topic, task and scope of the Bachelor's thesis must be limited in such a way that the candidate is able to complete the thesis within the given period.

(8) The thesis may be written in German or English and must include a German or English summary.

§ 16 Submission and assessment of the Bachelor's thesis

(1) Three copies of the Bachelor's thesis must be submitted to the examinations board in time; the submission date must be recorded.

(2) When submitting the Bachelor's thesis, the candidate must assure in writing that he/she is the author of the work and has used no sources or aids other than those indicated.

(3) The Bachelor's thesis is assessed by two examiners. § 6, Sections 1 and 2 apply accordingly. The first examiner should be the supervisor of the thesis. The candidate is allowed to make a proposal that does, however, not constitute a legal entitlement. The evaluation period should not exceed a period of two weeks.

(4) The grade is calculated as the mean of both assessments; § 12, Section 4 applies accordingly. If the grades differ by more than one grade level, the examinations board determines the Bachelor's thesis grade upon consultation with both examiners. In such cases, a third examiner may be consulted.

(5) If the Bachelor's thesis is graded as "failed" (5.0), it may be retaken with a new topic; retaking the thesis with the previous topic is not possible.

§ 17 Passing the examination and overall grade

(1) The Bachelor's examination is passed if all modules according to Attachments 1 to 4 (or according to Attachments 7 and 9 in the case of teaching degree programme specialisation for secondary school level physics) were successfully completed and all graded examination components completed during the course of study including the Bachelor's thesis (as well as the complementary subject grade as defined in Attachment 8 for the teaching degree programme specialisation for secondary schools) were graded as "sufficient" (4.0) or higher.

(2) § 12 applies for assessment of all examination components and the overall grade.

(3) The overall grade of the Bachelor's examination is calculated by weighting the grade of the Bachelor's thesis as well as of the individual graded modules according to the credits, and in accordance with Attachments 1 to 4 (or

according to Attachments 7 and 9 for calculation of the subject grade in Physics, as well as the additional subject grade in the complementary subject as defined in Attachment 8 for the teaching degree programme specialisation for secondary school level physics). Thanks to this approach, it is possible to exclude the grades of max. two modules from mean value formation. The student may freely select which modules to exclude; the Bachelor's thesis, however, may not be selected. In addition, the student may only select one module for exclusion per basic module (group of three main basic modules: Experimental Physics, Theoretical Physics, Mathematics) in accordance with Attachment 1 (or per basic module for the teaching degree programme specialisation for secondary school level physics, 2 main basic modules: Experimental Physics and Theoretical Physics in accordance with Attachment 7).

The overall grade is determined as follows:

for an average up to and including 1.5	very good
for an average between 1.6 and up to/including 2.5	good
for an average between 2.6 and up to/including 3.5	satisfactory
for an average between 3.6 and up to/including 4.0	sufficient

§ 18 Retaking an examination component integrated in the course of study, deadlines

(1) If examination components are not passed or considered not passed, they may be retaken once.

(2) A second retake is only possible due to severe reasons and by request to the examinations board. A second retake is not possible for the module Bachelor's thesis. § 3 Section 4 applies for the orientation examination.

(3) Retaking an examination that was passed is not permitted.

(4) If an examination component has been failed, it must be retaken at the next examination date; in the case of compulsory modules, the examination must be retaken within a period of one year. If candidates miss this deadline, they may not retake the examination component, unless they are not responsible for exceeding the deadline.

(5) If examinations in compulsory modules are failed twice (with the exception of the compulsory module Experimental Physics 1 - PEP1), the candidate may attempt to take an additional examination in max. two further compulsory modules; information on form and administration of additional examinations is defined in the module description.

(6) If the compulsory module is failed at the final attempt, the candidate will be excluded from the academic programme.

§ 19 Bachelor's diploma

(1) After the Bachelor's examination has been passed, a diploma will be issued within four weeks that indicates all individual modules with their respective grades and credit points, as well as the overall grade. The diploma is dated with the day of the last examination component. It must be signed by the chairperson of the examinations board.

(2) A Diploma Supplement in German and English is included, which contains additional information about the course content and period of studies.

§ 20 Bachelor's certificate

(1) A Bachelor’s certificate is issued with the diploma, or in the context of a degree ceremony, bearing the same date as the diploma. It certifies the conferment of the academic degree.

(2) The Bachelor’s certificate is signed by the Dean and the chairperson of the examinations board, and bears the faculty seal.

(3) If the candidate fails the Bachelor's examination, a certificate will be issued upon request and on presentation of relevant proof, listing passed examination components and corresponding grades as well as missing examination components. It is signed by the chairperson of the examinations board and includes a note that the Bachelor's examination was failed. The same applies for the Bachelor's examination if failed on the final attempt.

Section III: Final provisions

§ 21 Invalidity of examinations

(1) If a candidate cheats in an examination and is only discovered after the diploma has been issued, the examinations board may correct the examination results affected by the deception accordingly, and may declare the examination partially or completely failed.

(2) If the requirements for admission to the examination were not fulfilled without any intent to deceive on the candidate’s part, and is only discovered after the diploma has been issued, the passed examination is considered a compensation for this shortcoming. If the candidate intentionally gained admission to the examination through deceit, the examinations board must make the final decision.

(3) Before the decision is made, candidates will be given the right to provide an explanation.

(4) Fraudulent examination diplomas will be confiscated and a new diploma will be issued if necessary. The Bachelor's certificate will be confiscated along with the fraudulent examination diploma if the examination was graded as "failed" due to

deception. In accordance with Paragraph 1 and Paragraph 2, Sentence 2, a decision may not be made more than five years after the date printed on the examination diploma.

§ 22 Access to examination documents

The candidate may request access to written examination documents, examiner reviews and the examination minutes within a period of one year after completion of the examination procedure. The chairperson of the examinations board decides when and where access will be granted.

§ 23 Coming into force

These examination rules and regulations come into force on 01 October 2007.

Attachment 1: Compulsory modules Physics and Mathematics

Compulsory modules Physics

Module code	Module	CP
PEP1	Experimental Physics I	7
PTP1	Theoretical Physics I	8
PEP2	Experimental Physics II	7
PTP2	Theoretical Physics II	8
PEP3	Experimental Physics III	7
PTP3	Theoretical Physics III	8
PEP4	Experimental Physics IV	7
PTP4	Theoretical Physics IV	8
PEP5	Experimental Physics V	7
PAP1	Beginner's Lab I	6
PAP2	Beginner's Lab II	7
PFP1	Advanced Lab I	4
PFP2	Advanced Lab II	7
PSEM	Seminar	2
PBA	Bachelor's thesis	12

Compulsory and compulsory elective modules Mathematics

Module code	Module	CP
PMA1	Linear Algebra I	8
PMP2 *or* PMA2	Higher Mathematics for Physics II or Analysis II	8
PMP3 *or* PMA3	Higher Mathematics for Physics III or Analysis III	8

Note: As of the second semester, students may choose between the more application-oriented modules PMP2 and PMP3 (Higher Mathematics for Physicists) or two further basic modules in mathematics (PMA2 and PMA3). The modules, however, may only be selected as a combination; it is not possible to combine PMA2 with PMP3 or PMP2 with PMA3.

Special provisions: teaching degree programme specialisation for secondary school level (Gymnasium) physics

Contrary to the aforementioned provisions, students studying in the Bachelor's degree programme with a teaching degree programme specialisation for secondary school level physics can include the credit points collected in the (elective) compulsory

modules Mathematics (24 CPs) in their optional teacher training programme especially if the complementary subject is Mathematics). Work experience or laboratory courses as well as the seminar can be replaced with specific modules for the optional teacher training programme (see Attachment 7).

Module structure

Basic modules Physics and Mathematics
(the information is always module-specific)

Experimental Physics **PEP1 – PEP 5**	**WCH**	**CP** [total]
Lecture + Practice Group with	4 + 2	7
term papers and examination		

Theoretical Physics **PTP1 - PTP4**	**WCH**	**CP** [total]
Lecture + Practice Group with	4 + 2	8
term papers and examination		

Mathematics **PMA1 – PMA 3 and PMP2, PMP3**	**WCH**	**CP** [individual]
Lecture + Practice Group with	4 + 2	8
term papers and examination		

Compulsory Physics Labs

Beginner's Lab I **PAP1**	**Attendance**	**CP** [individual]	**CP** [total]
Block lab experiment execution	20 half days 4 h each	3	
Preparation and analysis	20 half days + self-study	3	6

Beginner's Lab II **PAP2**	**Attendance**	**CP** [individual]	**CP** [total]

Experiment execution	20 half days 4 h each	3	
Preparation and analysis (Report)		4	7

Advanced Lab I **PFP1**	**Attendance**	**CP** [individual]	**CP** [total]
Experiment execution (4 experiments)	4 x 4 half days in total: 80 h	3	
Preparation and analysis (report)		1	4

Advanced Lab II **PFP2**	**Attendance**	**CP** [individual]	**CP** [total]
Experiment execution (4 experiments; various instruments)	4 x 4 half days in total: 80 h	3	
Preparation and analysis (report)		2	
Seminar with laboratory	1	2	7

Compulsory Seminar **PSEM + UKS2**	**WCH**	**CP** [individual]	**CP** [total]
Seminar presentation (1h) and attendance during all presentations	2	2	
Presentation skills (UKS2) (Key skills, see Attachment 3)	1	1	3

Attachment 2: Compulsory elective modules Physics (14 CP)

These modules help the students gain more in-depth knowledge of sub-disciplines in physics and are worth min. 14 CPs. Students may choose from all elective modules in the Bachelor's programme in Physics. If all prerequisites are fulfilled, Bachelor's students may also choose modules from the Master's programme.

These modules are taken from the following areas: experimental physics with lectures on atomic and quantum physics, physics of condensed matter and particle physics; theoretical physics with courses offered in quantum statistics, quantum field theory, general theory of relativity, theory of condensed matter, and theoretical particle physics. In addition, there are also modules available in astrophysics, biophysics, medical physics, environmental physics and computational physics. Project labs or internships, in-depth seminars, special lectures and associated tutorials are also

offered in combination with these modules. If students wish to specialise early on in their degrees, they are provided with the option to register for specific Master's degree programme modules during the Bachelor's programme.

The courses in these elective Physics modules are not always offered in a fixed cycle. All available modules can be found in the Bachelor module handbook Physics; the model syllabi are intended for orientation purposes when planning the compulsory elective Physics and enable the student to structure the area of specialisation coherently.

Special provisions: teaching degree programme specialisation for secondary school level (Gymnasium) physics
Contrary to the aforementioned provisions, students studying in the Bachelor's degree programme with a teaching degree programme specialisation for secondary school level physics can include the credit points collected in the elective compulsory modules Physics (14 CPs) in their optional teacher training programme (especially if the complementary subject is Mathematics) (see Attachment 7).

Attachment 3: Interdisciplinary Skills

Aside from subject-specific skills, the Bachelor's degree programme in Physics also focuses on interdisciplinary and subject-independent skills. Students enrolled in the Bachelor's degree programme in Physics must obtain 20 CPs from the range of modules included in "Interdisciplinary Skills", the main focus of which is to acquire and consolidate interdisciplinary skills. 1 CP is already included (UKS2) in the compulsory course (see Attachment 1) due to integration in the compulsory seminar (PSEM). The remaining 19 CPs are freely selectable from the range of modules included in "Interdisciplinary Skills".

Students can choose two core modules from the range of interdisciplinary modules (Interdisciplinary Skills) as of the first semester. The modules are important components of stage 1 studies and include:

the preliminary course in Mathematics (UKV),
the basic course 'Key skills for a sustainable degree programme' (UKS1).

In general, both courses start at the end of September, three weeks prior to the beginning of the lecture period; the basic course continues during the first semester. Participation in these courses is not compulsory but nonetheless highly recommended. In addition to these two courses, a multitude of further elective modules are offered in the Bachelor's degree programme and can be chosen in connection with the "Interdisciplinary Skills" module; the basic range of modules and courses is listed in the module handbook. The number of participants is normally limited in these courses. Students are not entitled to participation in a specific course.

"Interdisciplinary Skills" modules taken in the subjects Mathematics, Computer Science and the natural sciences are generally recognized. In addition, courses not included in "Interdisciplinary Skills" modules in the module handbook can, upon application, be

recognised as such if they convey equivalent contents.

Special provisions: teaching degree programme specialisation for secondary school level (Gymnasium) physics
Contrary to the aforementioned provisions, students studying in the Bachelor's degree programme with a teaching degree programme specialisation for secondary school level physics can include the credit points collected in Interdisciplinary Skills (20 CPs) in their optional teacher training programme (see Attachment 7).

Attachment 4: Elective modules

Students must select one or two elective subjects and may include modules from these subjects worth max. 17 CPs. The subjects may be selected from the following range:

- Astronomy and astrophysics
- Sub-disciplines in physics
  - Astrophysics
  - Nuclear, molecular and optical physics
  - Biophysics
  - Medical physics
  - Physics of condensed matter
  - Environmental physics
  - Particle physics
  - Theoretical physics
- Chemistry
- Biology
- Geology
- Computer Science
- Scientific computing
- Electronics and data processing
- Physics of imaging
- Mathematics
- Mineralogy, crystallography
- Philosophy
- Physiology
- Economics

Additional electives may only be chosen in exceptional and justifiable cases and require the consent of the examinations board.
The Bachelor's module handbook includes suggestions on how to organise the most frequently selected electives. Other combinations are possible; in such cases, however, it is highly recommendable to speak to one of the academic advisors first.
The mandatory prerequisites, as defined by the individual subjects, for registration in the various modules, must be observed.

Special provisions: teaching degree programme specialisation for secondary school level (Gymnasium) physics

Contrary to the aforementioned provisions, students studying in the Bachelor's degree programme with a teaching degree programme specialisation for secondary school level physics can include the credit points collected in their elective (17 CPs) in their optional teacher training programme (especially if the complementary subject is Mathematics) (see Attachment 7).

Attachment 5: Model syllabi

Compulsory modules in the Bachelor's degree programme (130 CPs)

The Bachelor's degree programme includes a study block (basic modules) worth a total of 130 CPs which conveys the basic skills in physics and mathematics required to successfully complete the degree programme in Physics. This study block also includes the Bachelor’s thesis.

Compulsory electives and electives (50 CPs)

The remaining 50 CPs provide the students with the opportunity to gather specialised, in-depth knowledge in a research or application area in physics or an associated discipline according to their personal interests and abilities, or subject-specific additional qualifications and methodological skills. The aim is to provide students with a Bachelor's degree that paves the way to a successful career.

Highly research-oriented students who wish to qualify for the consecutive Master's degree programme can, in Heidelberg, choose a research focus in physics as early as at the beginning of the 3rd semester (e.g. astrophysics, biophysics, computer science, environmental physics or the main research areas in theoretical and experimental physics). Once they have started the more advanced semesters in their Bachelor's degree programme, they may also opt to take Master's degree programme elective compulsory modules during their Bachelor's as long as they fulfil all prerequisites. A minimum of 19 CPs (of the available 50 CPs for compulsory electives and electives) must be gained in the "Interdisciplinary Skills" modules (Attachment 3), and a minimum of 14 CPs must stem from the compulsory elective modules in Physics. The remaining 17 CPs may be used for elective modules in elective subjects related to Physics or in associated disciplines (Attachment 4).

Due to the extremely large number of choices, the module handbook for the Bachelor's degree programme in Physics presents model degree programmes for various specialisation areas with application and/or research orientation. In this document, we can only present the model syllabus for the compulsory components.

Model syllabus for compulsory courses in physics (130 CPs)

Study block	1st semester	2nd semester	3rd semester	4th semester	5th semester	6th semester
Compulsory modules (basic courses)	PEP1 7 PTP1 8	PEP2 7 PTP2 8 PAP1 6	PEP3 7 PTP3 8	PEP4 7 PTP4 8 PAP2 7	PEP5 7 PFP1 4 PSEM 2	BA 12 PFP2 7
Compulsory elective Mathematics	PMA1 8	PMP2 8 *Or* PMA2 8	PMP3 8 *Or* PMA3 8			
Personal skills. Key skills.					UKS2 1	
Sum of CPs	**23**	**29**	**23**	**22**	**14**	**19**
Remaining CPs	**7**	**1**	**7**	**8**	**16**	**11**

Attachment 5: Grading in accordance with ECTS

ECTS grades are awarded for successfully completed examination components and are assigned as follows:

A the top 10 %
B the subsequent 25 %
C the subsequent 30 %
D the subsequent 25 %
E E the subsequent 10 %

Data may be collected from one examination date, or one or several academic years. The basis of the data is disclosed with the ECTS grade. In the case of degree grades, the ECTS grade must be included. For individual modules, the ECTS grade may be listed when possible and necessary.

Attachment 7: Teaching degree programme specialisation for secondary school level (Gymnasium) physics

The teaching degree programme specialisation for secondary school level (Gymnasium) physics is targeted at students whose aim is to study physics with the option of teacher training. Instead of the laboratory courses/internships PAP1, PAP2, PFP1 and PFP2 defined in Attachment 1, as well as the compulsory seminar PSEM, these students must take the optional teacher training modules Beginner's Lab (Physics) for the Teaching Degree Programme I (PAPL1) and Astrophysics for the Teaching Degree Programme (PASTRO). The latter also includes a component on specialised didactics (2 CPs). This means that a total of 74 CPs are intended for specialist training while 2 CPs are intended for didactic training in Physics.

In accordance with Attachment 8, a further 74 CPs and/or 2 CPs must be gained in specialist training and didactic training in the second teacher training subject. The remaining 16 CPs are to be gained in interdisciplinary skills modules, or in education studies modules and laboratory courses/internships (see Attachment 9).

Compulsory modules teaching degree programme specialisation for secondary school level (Gymnasium) physics

Module code	Module name	Knowledge (CP) [1]	Didactics (CP) [1]
PEP1	Experimental Physics I	7	
PTP1	Theoretical Physics I	8	
PEP2	Experimental Physics II	7	
PTP2	Theoretical Physics II	8	
PEP3	Experimental Physics III	7	
PTP3	Theoretical Physics III	8	
PEP4	Experimental Physics IV	7	
PTP4	Theoretical Physics IV	8	
PEP5	Experimental Physics V	7	
PAPL1	Beginner's Lab (Physics) for the Teaching	6	

	Degree Programme I		
PASTRO.1	Astrophysics for the Teaching Degree Programme (short lab/internship)	1	
PASTRO.2	Astrophysics for the Teaching Degree Programme (lecture/practice class)		2

[1] Based on the European Credit Transfer System (ECTS), the modules are allocated a certain number of credit points (CP).

ATTACHMENT 8: In the context of the teaching degree programme specialisation for secondary school level (Gymnasium) physics, combinations with the following subjects are possible:

- Fine Arts
- Biology
- Chemistry
- Mandarin
- German with German as a Foreign Language components
- English
- Protestant Theology
- French
- Geography
- History
- Greek
- Computer Science
- Italian
- Jewish religious education
- Latin
- Mathematics
- Music (in cooperation with Mannheim)
- Philosophy/Ethics
- Political science
- Russian
- Spanish
- Sport
- Economics

Attachment 9 Interdisciplinary Skills

Two modules are offered as interdisciplinary skills modules:
Module Teaching Degree option (20 CPs):
Aside from the 2 CPs gained for specialised didactics training for physics, an additional 18 CPs are available and can be collected in the following modules:

- Specialised Didactics 2 teacher training subject in accordance with Attachment 8 (2 CPs)

- Introduction to School Pedagogy/Pedagogical Psychology (6CPs)
- Basics of Education Studies (4 CPs)
- Professional internship (3 weeks) in a school (3 CPs)
- Professional internship II (3 weeks) in an educational institution or school (3 CPs)

Optional interdisciplinary module (20 CPs):
Aside from the 2 CPs awarded for specialised didactics training for physics and the second subject (see Attachment 9), there are an additional 16 CPs available. We highly recommend courses from the following list:

Course	Competence	CPs
Internship/Lab	Ability to work in a team, time management, personal and key skills, practice-oriented problem solving skills, ability to think and act in an interdisciplinary manner	6
Seminar	Dialogue competence, presentation skills	2
Lab project	Ability to work in a team, time management, personal and key skills, practice-oriented problem solving skills, ability to think and act in an interdisciplinary manner	8

The above curriculum is polyvalent when combined with the optional teacher training Bachelor's degree programme Mathematics, as education studies as well as professional orientation components may, where necessary, be taken at a later date in the case of conditional admission to the degree programme Master of Education (this is not necessary in the case of admission to the Master of Science in Physics).

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Published in the President's bulletin (Mitteilungsblatt des Rektors) of 26 January 2007, p.249, modified on 14 September 2007 (President's bulletin of 19 October 2007, p. 2819), on 28 May 2008 (President's bulletin of 24 June 2008, p.461), on 18 May 2009 (President's bulletin of 15 June 2009, p.749), on 15 February 2010 (President's bulletin of 24.02.10, p.161), on 12 November 2010 (President's bulletin of 26 November 2010, p.1819), on 7 February 2013 (President's bulletin of 28 February 2013, p.87), on 16 May 2013 (President's bulletin of 28 June 2013, p.595), on 20 November 2013 (President's bulletin of 17 December 2013, p.835) and modified on 29 July 2015 /President's bulletin of 28 August 2015).