

**Examination
Regulations
of Ruprecht-Karls-University Heidelberg
for the
Master of Science
in Advanced Physical Methods
in Radiotherapy**

of 01 October 2010

Based on Sec. 34 of the State Law Governing Universities, and Other Institutes of Higher Education (Landeshochschulgesetz), the Rector of Heidelberg University on 24 November 2009 by way of a summary decision, has adopted the following Examination Regulations for the Master of Science in Advances Physical Methods in Radiotherapy.

The Rector has given his approval on 01 October 2010.

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Chapter I: General Provisions

Section 1 Course and Examination Objectives

- (1) The Medical Faculty of Heidelberg at Heidelberg University offers a distance learning, postgraduate course to acquire deeper knowledge and skills in the field of medical physics. It supplements a degree in a physical or physical-technical subject, in biomedical engineering or an equivalent engineering program or courses with largely similar contents at a German or foreign university with a standard course duration of no less than three years of study or a degree recognized as equivalent in Baden-Württemberg. The objective of this postgraduate program is to convey not only medical-physical teaching content, but also the necessary deeper knowledge and skills, which are required for radiotherapy treatment and further development of medical physics in radiotherapy.
- (2) The Master in Advanced Physical Methods in Radiotherapy Program may be completed by earning the professional degree of a Master of Science in Advanced Physical Methods in Radiotherapy.
- (3) The examination for a Master of Science in Advanced Physical Methods in Radiotherapy is intended to determine whether students are qualified to practice. The examination is intended to determine in detail, whether students have acquired the necessary in-depth specialist knowledge and competences, to penetrate complex interrelationships within individual subjects and among the various disciplines and to have the ability to independently apply the scientific insights and methods specific to their profession.
- (4) Admission to study is regulated in separate Admission Regulations.

Section 2 Master Degree

Upon passing the Master examination, Heidelberg University, represented by the Medical Faculty of Heidelberg, awards the academic degree of a Master of Science in Advanced Physical Methods in Radiotherapy.

Section 3 Standard Course Duration, Curriculum, Range of Courses

- (1) The standard duration of the Master Program, including the Master examination, is four semesters. This includes the time required to prepare the Master's thesis. In total, 120 ECTS units are required to successfully complete the Master Program.

- (2) 45 of such 120 units
 - comprise preliminary work according to the Admission Regulations, Sec. 3 para. (3) and (4). They will be determined by way of a general credit system, including a commission review of the postgraduate program contents of the individual academic providers and an assessment by way of an equivalence comparison with the scientific societies' guidelines in ECTS units. Qualified occupation will be subject to an individual review.
 - 45 units for required modules and
 - 30 units for the Master's thesis.

- (3) The study program comprises the following contents:
- Module 1: Anatomy and imaging for radiotherapy
 - Module 2: Intensity-modulated radiation therapy
 - Module 3: Ion therapy
 - Module 4: Adaptive Radiotherapy
 - Module 5: Advanced dosimetry and quality assurance
 - Module P: Internships in the following areas:
 - Radiation planning
 - Intensity-modulated radiation therapy
 - Adaptive radiotherapy
 - Ion therapy
 - Dosimetry and quality assurance
 - Independent preparation of a Master's thesis.

The respective teaching program is determined and announced by the Course Director in due time prior to the start of the semester.

The program's courses are held in English.

- (4) At the end of each semester, a transcript of records will be issued, listing the passed (part) unit examinations, together with the respective credits and marks.
- (5) The total course duration, including examinations and preparation of the Master's thesis, should not exceed a period of eight semesters. Anyone who after such period has not fully completed the Master examination, shall lose their entitlement to an examination, unless he/she is not responsible for exceeding the deadline.

Section 4 Examination Board

- (1) An Examination Board shall be set up for the organization of examinations and for the tasks assigned under the present Examination Regulations. Such Board shall be comprised of five members, a majority of whom must be university teachers. Members shall be appointed by the Expanded Faculty Council of the Medical Faculty of Heidelberg. Members shall be appointed for a term of three years and may be reappointed. The Director of the Program at the Medical Faculty of Heidelberg shall also chair the Examination Board. He or she must be a university teacher. At least one of the Examination Board members must be a professor of medical physics.

- (2) The Examination Board shall ensure compliance with the provisions of the Examination Regulations. It shall ensure that credits and qualifying examinations can be acquired or taken within the time periods specified in the present Examination Regulations. It shall periodically report to the Expanded Faculty Council about the development of examinations and course durations, including the actual times for preparing a Master's thesis and distribution of subject and overall grades and shall make suggestions regarding the further development of curriculum and Examination Regulations. The report shall be disclosed in a suitable manner. The Examination Board shall appoint the examiners for holding examination components under the Study Regulations or the modules, as well as the assessors. It may be called upon with regard to any issues relating to examinations.

- (3) The chairperson shall manage all Examination Board matters, prepare and chair meetings, and shall decide in case of a parity of votes. He/she shall be authorized in place of the Examination Board to make any decisions that cannot be delayed, in his/her own discretion. The Examination Board shall be notified of such incidents without delay, and in any event during the next meeting. The chairperson's rights shall in case of his/her absence pass to the deputy.

- (4) The Examination Board may at any time revocably assign additional Examination Board tasks to the chairperson and deputy, unless provided otherwise by statutory provisions. The Examination Board shall be periodically notified about the completion of such matters.
- (5) The Examination Board shall have a quorum if all of its members have been duly invited at least one week prior to the meeting and if a majority of members is present. It shall pass resolutions with a majority of cast votes. Abstentions, secret ballots, or delegation of votes shall not be permitted.
- (6) Examination Board members shall have the right to attend examinations.
- (7) Examination Board members, examiners, and assessors shall be subject to official secrecy. Unless they are public servants, they shall be required by the chairperson to maintain secrecy.
- (8) The candidate shall be notified without delay in writing about negative decisions by the Examination Board or by the chairperson, including reasons and information on legal remedies.

Section 5 Examiners and Assessors

- (1) As a general rule, only university teachers, lecturers and private lecturers as well as research staff, who after many years of successful teaching have been authorized by the Rector to examine, are authorized to hold examinations, other than course-related. Research associates, research staff, contract teachers and special task teachers may be appointed to hold exams only in exceptional cases where only an insufficient number of persons authorized to examine is available. The position of external examiners should be comparable to that of a German university teacher, lecturer or private lecturer.

- (2) All examiners shall be appointed by the Examination Board. Assessors shall be appointed by the examiner or lead examiner. As a general rule, all examiners and assessors shall be the instructors of the respective modules.
If examination results are held by several examiners, a lead examiner shall be nominated by the examiners involved.

- (3) Only a person with a completed Master degree in a physical or physical-technical subject, in biomedical engineering or an equivalent engineering program or courses with largely similar contents, may be appointed assessor. Assessors must be knowledgeable about the examination subjects of the modules of the Advanced Physical Methods in Radiotherapy Program.

- (4) The candidate may propose an examiner for the Master's thesis; this does not create a legal claim to a specific examiner.

- (5) The Chairperson of the Examination Board or his/her deputy shall ensure that the candidate will be provided in due time with the examiner's name, in any event no later than upon commencement of the attendance period of the respective module, when module documents are sent out.

Section 6 Recognition of Study Periods, Coursework, Examination Components and Degrees

- (1) Study periods, coursework, and examination components in programs completed at a German university or comparable tertiary institution, shall be recognized if found to be equivalent. This shall be the case if contents, scope, and requirements of study periods, coursework, and examination components are equivalent to those of the Master in Advanced Physical Methods in Radiotherapy Program at Heidelberg University. In so doing, instead of schematic comparison, a comprehensive view and overall assessment shall be applied.
- (2) Recognition of study periods, coursework, and examination components completed outside Germany shall require compliance with the equivalence agreements approved by the Conference of the State Ministers of Education and Cultural Affairs and German Rectors' Conference as well as agreements in the context of university partnerships.
- (3) Para. 1 shall apply accordingly to study periods, coursework, and examination components completed in officially recognized distance learning programs and at other education institutions, including without limitation at a cooperative university or a public or officially-recognized vocational academy.
- (4) If coursework and examination components are recognized, the grades - to the extent that grading systems are comparable - shall be taken over and included in the calculation of the overall grade, in accordance with the present Examination Regulations. In case of non-comparable grading systems, the remark "passed" shall be included. Inclusion of credits may be noted in the certificate.

- (5) Any decision according to para. 1 to 4 shall be made by the Examination Board. Students shall submit the documents required for recognition.
- (6) Recognition of parts of the Master examination may be refused if more than half of all course-related examination components or the Master's thesis should be recognized.

Section 7 Cancellation, Default, Failure to meet Deadlines, and Cheating

- (1) Examination results shall be marked "inadequate" if the candidate fails to attend an examination without good reason or if he/she cancels after commencement of the examination without good reason. The same shall apply in case of failure to complete written examination results within the specified period of time.
- (2) The reasons provided for cancellation or failure according to para. 1 must be provided to the Examination Board without delay in writing and must be substantiated. If the candidate or a child who is mainly cared for by the candidate falls ill, a medical certificate shall be presented; in case of doubt, a certificate by a physician nominated by the University may be requested. If the reasons are recognized, a new date shall be scheduled. Any available examination results shall be included in such case.
- (3) In its decision whether the candidate is responsible for exceeding a deadline for registering and submitting his/her Master's thesis, the Examination Board shall consider any protective provisions analogous to the Maternity Protection Act (Mutterschutzgesetz) and the statutory provisions regarding maternity/paternity leave and shall allow for their application.

- (4) If the candidate attempts to manipulate the examination results by cheating or by using non-approved aids, the relevant examination results shall be marked "fail". A candidate interfering with the due course of an examination may be excluded by the examiner or supervisor from the further examination results; in such case, the relevant examination results shall be marked "fail". In serious cases, the Examination Board may exclude the candidate from any further examination components.
- (5) The candidate may within a period of one week demand that decisions according to para. 4 sentence 1 and 2 will be revised by the Examination Board. The candidate shall be notified without delay in writing about any incriminating decisions, including reasons and information on legal remedies.

Section 8 Types of Examination Components

- (1) Examination components include
- course-related oral examinations
 - course-related written examinations (as the case may be by electronic means)
 - the Master examination.
- (2) If the candidate provides a medical certificate to substantiate that due to prolonged or permanent physical disability he/she is unable to complete examination components as a whole or in part as scheduled, the Examination Board may allow for equivalent examination components to be completed in a different form. The same shall apply to coursework.

Section 9 Oral Examination Components

- (1) In oral examination components, the candidate must demonstrate that the interrelationships of the relevant subject are understood and that specific issues can be placed in such interrelationships. Furthermore it should be determined whether the candidate has the basic knowledge commensurate to his/her studies as well as deeper knowledge in the outlined topics of the field of examination.

- (2) As a general rule, oral examination components shall be completed before two examiners or one examiner in the presence of a knowledgeable assessor.

- (3) Oral examination components shall last between 15 and 60 minutes.

- (4) The main subjects and the results of oral examination components shall be noted in a report. The candidate shall be notified about the result subsequent to the oral examination results.

Section 10 Written Examination Components

- (1) In written examination components the candidate must demonstrate that he/she is able to recognize a problem and find ways of solving it within a limited period of time and with limited aids, using the standard methods of the subject.
- (2) Written examination components shall last between 60 and 240 minutes.
- (3) Written examination components shall be completed in the form of written tests, term papers, or internship reports, under examination conditions. To that end, the candidate shall issue a statement in accordance with Sec. 16 para. 2.
- (4) As a general rule, written examination components shall be graded by two examiners. The arithmetic mean of the individual grades shall be the final grade. As a general rule, grading shall be completed after eight weeks, at the latest.

Section 11 Grading of Examination Components

(1) The grades for individual examination components shall be determined by the respective examiners. The following grades shall be used:

- 1 = very good = outstanding performance;
- 2 = good = performance exceeding average requirements;
- 3 = satisfactory = performance meeting average requirements;
- 4 = adequate = performance meets the minimum criteria;
- 5 = fail = performance does not meet the minimum criteria due to significant shortcomings.

For a more differentiated assessment, individual grades may be raised or lowered to intermediate values by 0.3 points; in so doing, grades 0.7, 4.3, 4.7, or 5.3 shall be ruled out.

(2) Examination results have been passed if it has been graded at least as "adequate" (4.0). A module examination has been passed if all associated part module examinations have been passed. The module grade shall be based on the arithmetic mean of the part module examination grades.

(3) When determining module grades and the overall grade, only the first decimal point shall be taken into account; all other decimal figures shall be deleted without rounding.

- (4) Students, who have successfully passed the relevant examination results, in addition to the grade under the German system, shall also be given an ECTS grade based on the following calculation:

A the top 10%

B the next 25%

C the next 30%

D the next 25%

E the next 10%

Data collection may refer to an examination date, a study year, or to several study years. The data basis is shown in the ECTS grade.

Section 12 Repeating Examination Components

- (1) Examination components, which have been failed or are deemed to have been failed, may be repeated once.
- (2) A second repeat shall be possible for serious reasons only, upon request with the Examination Board. A second repeat of the Master's thesis shall be excluded.
- (3) Passed examination results may not be repeated.
- (4) Failed examination components must be repeated at the next possible date. If such deadline is missed, the examination entitlement shall expire, unless the candidate is not responsible for missing the deadline.

Chapter II: Master Examinations

Section 13 Requirements for Admission to prepare a Master's Thesis

Only persons meeting the following requirements may be admitted to a Master examination:

- (1) Completion of a certificate of qualification for university matriculation, relevant sub-related qualification for university matriculation, or of a certificate recognized as equivalent;
- (2) Enrollment at Heidelberg University in the Master in Advanced Physical Methods in Radiotherapy Program;
- (3) No loss of examination entitlement in the Master in Advanced Physical Methods in Radiotherapy Program.
- (4) Admission to prepare a Master's thesis shall furthermore require presentation of all certificates regarding successful completion of the teaching courses specified in Annex 1.

Section 14 Admission Procedure

- (1) An application for admission shall be addressed in writing to the Chairperson of the Examination Board. The following documents shall be attached to such application:
 - Evidence of completion of the admission requirements specified in Section 13;
 - Statement whether the candidate has already failed a Master examination in a Master in Advanced Physical Methods in Radiotherapy Program or whether he/she is enrolled in examination procedures in the same study program.

- (2) If the candidate is unable to present the relevant evidence as required, the Examination Board may permit evidence to be furnished in a different way.

- (3) If Module P has not yet been completed in full, upon relevant request, the Examination Board may issue a conditional admission to the Master's thesis. Successful completion of Module P must be demonstrated prior to presentation and defense of the Master's thesis.

- (4) The Examination Board shall decide on the admission based on the application. A rejection shall be notified in writing, including reasons and information on legal remedies.

- (5) An application for admission may be rejected only if
 - the conditions according to Sec. 13 have not been met; or
 - the documents according to para. 1 are incomplete and in spite of a relevant request were not completed; or
 - the candidate has finally failed the Master examination in the Advanced Physical Methods in Radiotherapy Program or has lost his/her examination entitlement; or
 - the candidate is in the middle of an ongoing examination procedure of the same study program.

Section 15 Scope and Type of Examination

- (1) Examination components include
 1. Course-related written and oral examination components to be completed in the respective modules (cf. Sec. 8);
 2. The Master's thesis; and
 3. Presentation and defense of the Master's thesis.

- (2) The examinations according to para. 1 no. 1 shall be completed as part of the respective modules and shall be written or oral in accordance with Sec. 9 and 10.

Section 16 Master's Thesis

- (1) The Master's thesis is intended to demonstrate that the candidate is able to process a theoretical or empirical task or a task involving a specific application of procedures and their analysis, within a specified time frame and in accordance with known methods and scientific aspects.

- (2) The Master's thesis may be assigned and supervised by any person authorized to examine in accordance with Sec. 5 para. 1 sentence 1.

- (3) The topic of the Master's thesis shall be proposed in writing to the Examination Board by the supervisor together with the participant. The candidate shall be given the opportunity to propose topics; however, this shall not create any legal entitlement. The topic shall be assigned by the Chairperson of the Examination Board or his/her deputy. Date and time of such assignment shall be put on the record.

- (4) The period of time from assignment to submission shall be six months. In exceptional cases, the period may be extended by the Examination Board upon consultation with the supervisor, by up to four months. In case of failure to adhere to the above period, the thesis shall be graded "fail", unless the candidate is not responsible for exceeding the deadline.
- (5) Topic, objective, and scope of the Master's thesis shall be limited so as to allow for compliance with the submission deadline. The topic may be returned only once and only within the first two months after assignment.
- (6) As a general principle, the Master's thesis shall be written in English.
- (7) The student must commence working on the Master's thesis no later than six weeks after completion of the final examination results according to Sec. 15 para. 1 no. 1 or apply with the Chairperson of the Examination Board for being assigned a topic for the Master's thesis. If the student has missed such deadline, the Master's thesis shall be deemed failed, unless the candidate demonstrably is not responsible for exceeding such deadline.

Section 17 Submission and Grading of the Master's Thesis

- (1) The Master's thesis shall be submitted in triplicate in due time to the Examination Board; date and time of submission shall be put on the record.
- (2) When submitting the Master's thesis, the candidate shall represent in writing that he/she has prepared the thesis him-/herself and that no sources and aids other than those indicated were used. It furthermore shall be represented that the submitted thesis has not been as a whole or in part used for examination results and that the submitted thesis has not yet been published in English or in any other language.

- (3) The Master's thesis shall be graded by two examiners. The first examiner shall be the supervisor of the thesis. The second examiner shall be nominated by the Examination Board or its deputy. The grading procedure shall not exceed twelve weeks in total.
- (4) The first reviewer may return the thesis for reworking if from his/her point of view it does not meet the requirements of adequate work, but is capable of being improved. In case of failure to rework the thesis within three months from its return, the thesis shall be graded in its submitted form. In exceptional cases, the Chairperson of the Examination Board may upon request by the candidate extend the reworking period by up to three months.
- (5) The grade shall be based on the arithmetic means of the two grades; Section 11 shall apply accordingly. Both examiners must grade the thesis at least as adequate.
- (6) The Master's thesis, including presentation and defense, shall account for 30 units (LP/CP according to ECTS).

Section 18 Presentation and Defense of the Master's Thesis

- (1) Students shall present their Master's thesis as part of an oral presentation and shall defend it in a subsequent disputation. As a general rule, presentation and defense together shall last between 30 and 60 minutes. The defense shall take place before an Examination Board, which shall be comprised as follows:
 1. The examiners, who have graded the thesis, and
 2. An assessor.The defense of the Master's thesis shall not be open to the public.
- (2) As a general rule, presentation and defense shall take place eight weeks after submission of the thesis. The date shall be determined by the Examination Board and shall be notified to the candidate no later than two weeks prior to the date of presentation.

- (3) Presentation and defense shall be recorded in writing and signed by the examiner.
- (4) The grade for presentation and defense shall be the arithmetic mean of the individual grades assigned by the involved examiners.
The overall grade for the Master's thesis shall be based on the weighted individual grades for presentation and defense (25%) and written Master's thesis (75%).
- (5) The grade shall be notified to the candidate subsequent to the Master examination and shall be confirmed in writing.
- (6) If presentation and defense have been graded "fail", the examination results may be repeated once (cf. Sec. 18). If the attempt at repetition fails as well, the Master's thesis, including presentation and defense must be repeated.
- (7) As a general rule, presentation and defense shall be held in English; upon request, German may be selected as examination language.

Section 19 Passing the Examination

- (1) The Master examination has been passed if all examination components have been graded at least "adequate".

- (2) For calculation of the overall grade according to Sec. 11, based on the grades for examination components according to Sec. 15 para. 1 no. 1 and the overall grade for the Master's thesis according to Sec. 18 para. 4, two partial grades are formed, which flow into the overall grade with the following weighting:
 1. Average of the two weighted partial grades from the six modules 60%,
 2. Master's thesis 40% (incl. presentation and defense)

- (3) When forming partial grades and the overall grade, the respective first decimal point is considered; all other decimal figures are deleted without rounding.

Section 20 Master Certificate and Diploma

- (1) As a general rule, within eight weeks from passing the Master examination a certificate shall be issued, indicating the individual modules and the respective realized grades and allocated credit points, the topic of the Master's thesis as well as the overall grade. The certificate shall be dated as of the date of the completion of the final examination result and shall be signed by the Chairperson of the Examination Board. The Master certificate shall be issued in English.

- (2) An English diploma supplement shall be attached to the certificate, comprising additional information about contents of the program and course of studies, including without limitation the titles of the individual modules and the realized grades, grade points, and credit points as well as the grade point average and the total grade as well as the total credit points realized.

- (3) Together with the certificate, an English-language Master certificate dated of the date of the certificate shall be issued. This shall certify the award of the academic degree of a Master of Science in Advanced Physical Methods in Radiotherapy. It shall be signed by the Dean and by the Course Director.

- (4) If the Master examination has been finally failed or if it is deemed finally failed, the Chairperson shall issue a relevant written notification, including information on legal remedies. Upon request and presentation of relevant evidence as well as the exmatriculation certificate, a certificate showing completed examination components and the relevant grades as well as any examination components still missing for the Master examination shall be issued, indicating that the Master examination has not been passed.

Chapter III: External Examinations

Section 21 External Examinations

- (1) The Master of Science in Advanced Physical Methods in Radiotherapy Program provides for the options of completing the Master examination as a non-enrolled student (external examination).
- (2) The following persons may be admitted for external examination:
 - a) Persons meeting the admission requirements under Sec. 3 of the Admission Regulations; and
 - b) Persons, who have completed the modules specified in the present Regulations or who are able to demonstrate relevant adequate coursework from another course, which has been recognized by the Examination Board;
 - c) Persons, who have not lost their examination entitled for the Master of Science in Advanced Physical Methods in Radiotherapy Program.
- (3) The application for admission to external extermination must be submitted to the Examination Board in writing no later than by the time the topic of the Master's thesis is issued. The following shall be attached to such application:
 - a) Evidence that the admission requirements specified in para. 2 have been met;
 - b) A statement whether the candidate has already finally failed a Master or external examination in the Master of Science in Advanced Physical Methods in Radiotherapy Program or in a similar program or whether he/she is currently in an examination procedure.
- (4) Upon admission to external examination, the candidate shall be assigned a topic for the Master's thesis. The regulations regarding the Master's thesis, the oral presentation, including defense, and passing of the Master examination, shall apply accordingly.

Chapter IV: Final Provisions

Section 22 Invalid Examinations

- (1) If the candidate has cheated in examination results and if such facts become known only after issuing the certificate, the Examination Board may retroactively adjust the grades for such examination components, where the candidate has cheated, accordingly, and may declare the examination as a whole or in parts failed.
- (2) If the conditions for admission to an examination were not met without the candidate intending to cheat in this respect, and if such fact becomes known only after issuing the certificate, then such defect shall be remedied by passing the examination. If admission was intentionally unjustly effected, the Examination Board shall decide.
- (3) The candidate shall be provided with an opportunity to comment before a decision is made.
- (4) The incorrect certificate shall be collected and, as the case may be, a new one issued. Together with the incorrect certificate, the associated Master diploma shall be collected as well, if the examination was declared to have been failed because of cheating. A decision according to para. 1 and para. 2 sentence 2 shall be excluded after the expiry of a period of five years from the date of the certificate.

Section 23 Access to Examination Files

Upon completion of the examination procedure, upon written request, the candidate shall be granted access to the examination files. Such request shall be filed within one year from completion of the examination procedure. The Chairperson of the Examination Board shall determine time and place of such access.

Section 24 Effective Date

The present Examination Regulations shall take effect on the first day of the month following publication in the Rector's newsletter.

Heidelberg, 01 October 2010

signed: Professor Dr. Bernhard Eitel
 Rector

Annex 1: Master Program Courses

Module	Contents	Classes*		Written tests Presentations*	Total*
		Attendance	Online		
	M0 Introductory course				
Module 1: Anatomy and Imaging for Radiotherapy	M1.1 Introduction module 1 M1.2 Anatomy for Physicists and Engineers: M1.3 Imaging for Radiotherapy M1.4 Radiological and Virtual Anatomy M1.5 Diagnostic Radiology M1.6 Workshop K1 Test (written)	0.5 0.5	 1.5 1 2 1	 1	 7.5
Module 2: Intensity Modulated Radiotherapy (IMRT)	M2.1 Introduction module 2 M2.2 Introduction to IMRT M2.3 IMRT in Clinical Practice M2.4 Advance Application Technologies M2.5 Workshop K2 Test (written)	0.5 0.5	 1.5 2 2	 1	 7.5
Module 3: Ion therapy	M3.1 Introduction module 3 M3.2 Physical Foundations M3.3 Radiation Generation and Application M3.4 Radiation Biology M3.5 Radiation Planning M3.6 Clinical Application of Ion Therapy M3.7 Seminar K3 Test (written)	0.5 0.5	 1 1 1 1 1	 0.5 1	 7.5

Module 4: Image Guided Radiotherapy (IGRT) and Adaptive Radiotherapy (ART)		M4.1 Introduction module 4 M4.2 IGRT Techniques (Physics) M4.3 Clinical Applications of IGRT (Medicine) M4.4 Moved Target Volumes and Adaptives Radiation Therapy (Medicine/Physics) M4.5 Workshop K4 Test (written)	0.5 0.5	2 1.5 2	1	7.5
Module 5: Advanced dosimetry and quality assurance		M5.1 Introduction module 5 M5.2 Basic Dosimetry M5.3 Dosimetry for Modern Radiation Therapy Techniques M5.4 Quality Assurance (QS) M5.5 Workshop K5 Test (written)	0.5 0.5	2 2 1.5	1	7.5
Module P*: Internships	Compulsory	P1.1 Internship Radiation Planning	2			7.5
	Elective	P1.2 Internship IMRT	1.5			
	Elective	P1.3 Internship ART	1.5			
	Compulsory	P1.4 Internship Ion Therapy	2			
	Compulsory	P1.5 Internship Dosimetry and QS	2			
Master's thesis					30	30
			12.5	27	35.5	S 75

* All information in ECTS credits

** In module P, all compulsory internships and one of the two elective internships must be attended, so that overall, internships totaling 7.5 credits have been successfully completed.

This document is a translation. Only the German text is legally effective.