

This is a translation of the original document in the German language. For all legal purposes, solely the German version of the examination regulations shall be considered binding.

Examination regulations
for the degree program in Automation & IT
conferring the degree
Master of Engineering (M.Eng.)
of the Faculty of Computer Science and Engineering Science
at Cologne University of Applied Sciences

of
January 23, 2015

By virtue of section 2 (4) and section 64 (1) of the North Rhine-Westphalia Higher Education Act (*Gesetz über die Hochschulen des Landes Nordrhein-Westfalen*) of October 31, 2006 (GV. NRW; p.474), last amended by the act of September 16, 2014 (GV.NRW. NRW p. 547), Cologne University of Applied Sciences has determined the following examination regulations by statute:

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I. General information

Section 1 Applicability of the examination regulations; catalog of modules and curriculum

- (1) These examination regulations are to administer the studies and examinations in the Master's program in Automation & IT at Cologne University of Applied Sciences.
- (2) Based on these examination regulations, Cologne University of Applied Sciences is to create a program schedule (cf. annex) as well as a module catalog. The module catalog is to outline the course contents and structure of the Master's program, taking developments in the fields of science and university teaching as well as profession-specific requirements into account. The curriculum is to provide students with a recommendation on how to adequately structure their studies

Section 2 Objectives of the program; purpose of the examinations; degree conferred

- (1) Students who pass the Master's examination are awarded a university degree qualifying them to exercise professional work in the field relevant to the program and entitling them to admission to doctoral/PhD-level studies in accordance with section 67 (4), phrase 1, No. 3 of the North-Rhine-Westphalia Higher Education Act.
- (2) Taking into account general study objectives (section 58 of the North Rhine-Westphalia Higher Education Act), the program leading to the Master's examination is designed to teach application-oriented topics of the discipline on the basis of scientific findings. It shall also enable students to critically analyze problems and assignments of automation engineering, to find constructively and economically justifiable solutions and, in doing so, be mindful of scientific principles as well as interdisciplinary perspectives. The program is designed to enhance the students' analytical and creative skills and to prepare them for their Master's examination. Moreover, the Master's program is to provide students with an opportunity to specialize in and delve deeper into an academic discipline.
- (3) The language of instruction in the Master's program is to be English.
- (4) The Master's program is consecutive to the Bachelor's program in Electrical Engineering at Cologne University of Applied Sciences.
- (5) The Master's examination (section 5) is to determine whether the examinee has attained sound specialized knowledge required to exercise work in his/her profession independently and whether he/she is capable of independently exercising work and conducting research on the basis of scientific findings and methods.
- (6) By passing the examinations listed in section 5, students will have completed a scientific degree program, allowing them to exercise work in the designated profession. Based on the successful completion of all examinations, Cologne University of Applied Sciences is to confer the academic degree Master of Engineering in accordance with the regulations stated hereinafter.

Section 3 Admission requirements; determination of eligibility

- (1) Successful applicants are required to hold an undergraduate degree from an institution of higher education in the fields of "electrical engineering" or "computer engineering" with a minimum degree of

Bachelor of Engineering, Bachelor of Science or another suitable field with a final grade of at least 2.5 (German grading system) or equivalent. Additionally, applicants are required to provide proof of their English language proficiency as well as of their motivation for enrolling in the program. The Examination Board is to decide on the suitability of a program.

(2) Applicants who possess the qualifications stated in subsection 1 and have additionally acquired knowledge and skills in ways other than in university studies are to be admitted to a stage of the program that corresponds to the results of the placement test pursuant to section 49 (12) of the North Rhine-Westphalia Higher Education Act, unless regulations on admission procedures conflict with this provision. Details are stipulated in Cologne University of Applied Sciences' regulations on placement tests.

(3) In exceptional cases, students may be enrolled in the program prior to having obtained their first degree (as stated in subsection 1) if they provide this degree within one year after enrollment.

(4) Applicants who hold a suitable undergraduate degree (as stated in subsection 1) with a final grade that is worse than 2.5 (German grading system) may still prove their professional qualification for the admission to the Master's program if they meet the following requirements:

- Proof of suitable professional experience of usually at least two years in a field relevant to the respective specialization of the program or
- A successfully conducted interview with the selection committee of at least 20 minutes duration.

The committee may also offer conditional admission that requires students to obtain additional achievements of up to 30 ECTS. The selection committee is to decide on nature and scope of the additional achievements.

(5) Language of instruction in the Master's program is to be English. Applicants therefore need to meet one of the following requirements:

- a) Having passed the TOEFL with at least 550 points on the paper-based test, 213 points on the computer-based test or 80 points on the internet-based test.
- b) Having passed the IELTS with 6.0 points.
- c) Having passed an alternative language test with a test score equivalent to those of TOEFL or IELTS.
- d) English as a mother tongue.

(6) Applicants are required to elaborately demonstrate their motivation for enrolling in the Master's program in a motivational letter of approx. two pages, written in English. The motivational letter is to be taken into consideration when determining a student's aptitude for the program. Applications submitted without a motivational letter are not to be considered. Moreover, selection interviews may be conducted to determine a student's aptitude or motivation.

(7) Admission is to be denied if the applicant has - within the jurisdiction of the German constitution - irreversibly failed the Bachelor's, Diplom or other final examination in the program in Automation and IT or if he/she has lost the right to take examinations in this or in a comparable degree program. Admission is also to be denied if the applicant has - within the jurisdiction of the German constitution - irreversibly failed a comparable examination in another degree program in the field of computer science or engineering or if he/she has lost the right to take said examination.

Section 4 Standard program duration; scope of the program; internationalization

(1) The standard duration of the degree program is four semesters. In compliance with the European Credit Transfer System (ECTS), students are awarded a total of 120 credits (section 12). The standard program duration includes the examination period.

(2) The program is segmented into individual modules. Detailed information can be found in section 23 and the curriculum (annex).

(3) Students are enrolled in the program's first semester in the winter semester of each year.

Section 5 Scope and structure of examinations; examination deadline

(1) A student's successful completion of the program is to be determined by the examinations taken throughout the program (module examinations) and a final examination (Master's thesis and final oral examination). Group examinations are permissible.

(2) Module examinations are to be held when the corresponding module has been concluded in accordance with the program schedule. The program schedule is to guarantee that the examinee can have taken all module examinations by the end of the fourth semester.

(3) In accordance with section 26, registration for the final part of the Master's examination (registration for the Master's thesis) is to be filed prior to the end of the penultimate semester of the program.

(4) The Examination procedures are to make allowance for the legal provisions for maternity and parental leave periods as well as the leave for the nursing and care of spouses, registered partners, relatives in direct line of descent or brothers and sisters in-law if they are in need of nursing or care.

(5) All examinations are to be held in English.

Section 6 Examination board

(1) The Faculty of Computer Science and Engineering Science is to establish an examination board to be in charge of the organization of examinations and the arrangement of the duties assigned to it by these examination regulations. The examination board is to be an independent body of the faculty.

(2) The examination board is to be elected by the faculty council and is to be made up of seven persons:

1. chairperson and vice chairperson selected from the pool of professors;
2. two additional members selected from the pool of professors;
3. one member selected from the pool of research assistants or lecturers;
4. two members selected from the pool of students.

(3) Deputies are to be elected for all members of the examination board except for the chairperson and the vice-chairperson. The members of the board employed in full-time positions at the university and their deputies have tenure of two years; the student members and their deputies have tenure of one year. Re-election is permissible.

Section 7 Rights and duties of the examination board

(1) The examination board is responsible for the organization of examinations. It is also to ensure that the examination regulations are complied with and that examinations are conducted properly. In particular, it is to decide on objections brought forward against decisions that were made in exam-related matters.

- (2) Moreover, the board is to report to the faculty council on developments related to examinations and the duration of studies, if so requested. It is to give advice on potential reforms of the examination regulations, the module catalog and the curricula. The examination board may transfer its regular duties to the chairperson of the examination board. This does not apply to decisions on objections.
- (3) The members of the examination board and a representative of the President's Office have the right to be present during examinations. Exempt from this right are student members of the examination board who are to take the examination concerned during the same examination period.
- (4) Meetings of the examination board are not open to the public.

Section 8 Decisions by the examination board

- (1) The examination board has a quorum if, in addition to the chairperson or vice-chairperson, a member from the pool of professors and at least two additional members eligible to vote are present. Decisions require a simple majority. In case of a tie, the chairperson has the casting vote. Student members and research assistants do not contribute to decisions on matters related to education and academics, particularly when it comes to the recognition or other evaluation of examinations and assessments or the appointment of examiners or co-examiners. Moreover, student members of the examination board do not participate in the debate and decision-making on matters related to examination topics or their own examinations.
- (2) All members of the examination board, their deputies, the examiners as well as co-examiners are to be sworn to official secrecy. If they are not employed in the German public service, they are to be sworn to secrecy by the chairperson of the examination board.
- (3) Incriminating decisions of the examination board or its chairperson are to be reported to the affected student immediately. Prior to any action, the affected student has to be granted the right to be heard.

Section 9 Examiners and co-examiners

- (1) The examination board is to appoint the examiners and co-examiners. A person may be appointed examiner if he or she holds at least the qualification that is to be determined by the examination or an equivalent qualification and – provided that no compelling reasons necessitate a divergence – has held an independent teaching position in the subject to be examined. This holds true for co-examiners as well (competent co-examiners). Examiners are independent for examination purposes.
- (2) The examinee may suggest one or more examiners for his or her oral examinations. He or she may also suggest an examiner to be his or her thesis advisor. If possible, a student's suggestion is to be taken into consideration.
- (3) The examination board is to ensure that examination duties are split as evenly as possible amongst the examiners. The chairperson of the examination board is to ensure that the examinee will be informed about his or her examiner in time. This shall happen simultaneously to the registration for the examination, i.e. usually at least two weeks before the examination is held or before the topic of the Master's thesis is assigned. Posting the information on the corresponding bulletin board is deemed sufficient.

Section 10 Recognition of examinations and assessments

- (1) Examinations and assessments completed in the same degree program within the jurisdiction of the German constitution are to be officially recognized.
- (2) Examinations and assessments completed in other degree programs within the jurisdiction of the Convention on the Recognition of Qualifications concerning Higher Education in the European Region of April 11, 1997 (Federal Law Gazette (BGBl. II 2007; p. 712 - Lisbon Recognition Convention) are to be officially recognized upon request if it can be proven that they do not considerably differ from the examinations and assessments required. If the recognition of such examinations and assessments is denied, the university is to issue a substantiated notification on this matter.
- (3) Examinations and assessments completed in degree programs outside the jurisdiction of the Lisbon Recognition Convention are to be recognized analogous to subsection 2 upon request.
- (4) Accomplishments that are not part of a degree program may be recognized as examinations or assessments upon request if they are equivalent to the examinations and assessments required. Such achievements may constitute to half of the total number of examinations and assessments required for the successful completion of the program at most.
- (5) For examinations and assessments that have been recognized, students are awarded the number of ECTS stated in the curriculum (cf. annex). Non-graded examinations taken at other universities or in other programs are to be recognized in accordance with subsections 1 to 3. They are to be identified accordingly on the examination certificate and are not accounted for in the calculation of the final grade.
- (6) The examination board is the decision-making body in all cases laid out in subsections 1 to 5. In cases of doubt, it is to consult the examiners responsible for the individual courses.

Section 11 Evaluation of examinations

- (1) Examinations are to be evaluated in a differentiated and comprehensible manner by means of grades. Reasons for the evaluation are to be explained in writing upon request of the examination board. Grades for individual examinations are to be determined by the respective examiner.
- (2) All module examinations of the degree program are graded examinations in accordance with subsection 1.
- (3) If several examiners participate in an examination, the examiners are to jointly evaluate the examination, provided that no other provisions are made hereinafter. Should the evaluations differ from one another, the grade is to be determined by the arithmetic mean of the individual grades.
- (4) The following grades are to be used for the evaluation of examinations:

1.0/1.3	= excellent	= an excellent examination;
1.7/2.0/2.3	= good	= an examination well above average requirements;
2.7/3.0/3.3	= satisfactory	= an examination that meets average requirements;
3.7/4.0	= sufficient	= an examination that meets the requirements despite its shortcomings;
5	= insufficient	= an examination that does not meet the requirements due to substantial shortcomings

The grades 0.7, 4.3, 4.7 and 5.3 are invalid.

(5) Calculated grades that differ from the grades listed above are to be determined as follows.

Figures:

up to 1.5	equal the grade	"excellent"
above 1.5 to 2.5	equal the grade	"good"
above 2.5 to 3.5	equal the grade	"satisfactory"
above 3.5 to 4.0	equal the grade	"sufficient"
above 4.0	equal the grade	"insufficient"

When it comes to the calculation of grades, only the first decimal is to be factored in; all other decimals are to be dropped without rounding.

(6) An examination is passed if the student's performance is deemed at least "sufficient". If the module examination is made up of various individual examinations, the module is passed if all individual examinations have been passed.

(7) The evaluation of examinations is to be completed within six weeks of the examination. Students are to be informed about the results; posting the results on the corresponding bulletin board is deemed sufficient. Students are to be notified of the results of the Master's thesis within eight weeks.

Section 12 Credits in accordance with the ECTS (European Credit Transfer System)

(1) Credits are to be assigned to every component of the Master's program, enabling recognition in accordance with the European Credit Transfer System (ECTS). Credits are a quantitative measure of the workload that averagely gifted students need to successfully complete a component of the program. This workload includes courses, preparation and follow-up work of a course, self-study as well as examinations and preparation for examinations.

(2) The workload required to successfully complete the degree program as laid down in the curriculum amounts to 60 credits per academic year. 1 credit corresponds to a workload of 30 hours.

(3) Students only receive credits if they have successfully completed a module. In accordance with section 11 (2 and 6), this means that students are awarded the total number of credits for every graded module examination that has been passed with a grade of at least "sufficient", irrespective of the grade received for the examination. A total of 120 credits are required to successfully complete the Master's program. Students will receive credits for non-graded module examinations if these are passed.

(4) The curriculum (cf. annex) gives an overview of the number of credits assigned to the individual modules and to the Master's thesis. More detailed information can be found in the module catalog.

(5) Credits obtained in accordance with the ECTS at other universities within and outside the jurisdiction of the German constitution are to be recognized with at most the number of credits designated in the current program, provided that the underlying examinations and assessments are deemed equivalent. For all other relevant matters, the regulations set down in section 10 apply.

Section 13 Evaluation of examinations in accordance with the ECTS grading scheme

The certificate awarded to graduates in accordance with section 31 (1) is to list ECTS grades as well. Details are to be determined at a later point in time based on the decisions made at the Standing Conference of the Ministers of Education and Cultural Affairs of the German *Länder* and the German Rectors' Conference.

Section 14 Retaking examinations; compensation; supplementary oral examination

(1) Students may retake module examinations if they do not pass them or if the examinations are considered "not passed". If a student did not pass a module examination that is made up of several individual components or a combination of different types of examination, he/she only has to retake the components which he/she did not pass. Students are required to retake an examination in the examination period that follows the failed attempt. If the examination is not retaken within one year after the failed attempt, students will lose the right to take this examination attempt. A second retake of the examination is to take place in the examination period that follows the first retake. If the second retake of the examination does not take place within one year after the failed second attempt, students will irreversibly lose the right to take examinations. Sentences 3 and 5 are rendered invalid if students provide evidence that they are not responsible for having missed the stipulated deadline.

(2) If a student does not pass the Master's thesis or the final oral examination, he/she may retake each examination once. Module examinations may be retaken twice.

(3) If the type of examination for a module is set to be a written examination, the examinee may take a supplementary oral examination once before his/her examination will be graded "insufficient" after having had a second retake; the supplementary oral examination is to be held upon request by the examinee immediately after he/she was informed about the result of the failed written examination. In accordance with section 19 (5), the supplementary oral examination is to be jointly held by the examiners of the written examination; moreover, the regulations on oral examinations apply accordingly. Due to the nature of the supplementary oral examination, the module examination can only be graded "sufficient" (4.0) or "insufficient" (5.0). Sentences 1-3 do not apply to the circumstances stated in section 15 (1 and 3).

(4) An examination graded at least "sufficient" may not be retaken.

Section 15 Absence; withdrawal from examinations; cheating

(1) An examination is deemed "insufficient" (5.0) if the examinee does not appear for an examination and is not able to present a good reason for his/her absence. An examination is also deemed "insufficient" if the student withdraws from it without good reason after the examination has begun or if he/she does not submit the examination by the time stipulated. The provisions stated above also apply if the student fails to submit his/her Master's thesis in due time.

(2) The reasons stated for missing or withdrawing from an examination are to be immediately reported to the examination board, to be documented in writing and to be substantiated by the student. In case of sickness, students are required to submit a comprehensible medical certificate attesting to their incapability of taking the examination. If the examination board accepts the reasons given, the examinee is to be notified that he/she may again file a request to be admitted to the examination concerned.

(3) If a student attempts to manipulate the result of his/her examination by cheating or by using non-permissible means, the examination concerned is to be graded "insufficient" (5.0). An examinee who disrupts the proper course of an examination may be expelled from the examination by the examiner or the invigilator after having been given prior warning; in such a case, the examination concerned is to be graded "insufficient" (5.0). The reasons for the expulsion are to be put on record. If the examinee is barred from retaking the examination, he/she may request the examination board to review this decision. This also applies to the decisions of an examiner or exam supervisor in cases described in sentence 1. Possible penalties as set down in section 63 (5) of the North Rhine-Westphalia Higher Education Act are to be acknowledged.

II. Module examinations

Section 16 Objectives, length and type of module examinations

(1) The Master's program is divided into individual modules, each of which concludes with an examination. The content of a module may be taught in one or more courses with different methods of teaching and study. The courses of a module usually run for the duration of one semester (or, if need be, for the duration of two semesters at the most). Pursuant to sections 19 to 22, a module examination may be subdivided into several individual examinations of the same or different type. The examinations are to determine whether students are proficient in the essential topics and methods taught in the modules and whether they are capable of independently applying the knowledge and skills acquired.

(2) The examination requirements are to be aligned with the contents of the courses offered in the module catalog. Students may be required to be familiar with relevant contents of previous modules.

(3) A module's type of examination depends on the requirements of the individual module. Admissible types of examination are written examinations (sections 19 and 21), oral examinations (section 21) of 20 to 45 minutes duration per examinee and other types of examination (section 22) as well as combinations of the aforementioned types of examination.

Written examinations may last

up to 90 minutes for modules with 2 weekly periods per semester

up to 120 minutes for modules with 4 weekly periods per semester

up to 150 minutes for modules with 6 weekly periods per semester

up to 180 minutes for modules with 8 weekly periods per semester

A student's total workload for module examinations made up of a combination of several types of examination is not to exceed the typical workload that a single type of examination would generate.

(4) After consultation with the examiners concerned and in observance of the module outline and the feasibility to complete the program within the allotted time frame, the examination board is to determine the type and modalities of examination for every module at the beginning of each semester.

If an examination within a module consists of several components or a combination of different types of examination, the examination board is also to specify how the individual components are to be weighted. At the suggestion of the respective examiners, the examination board sets the dates for the examination period for written and oral examinations usually one month prior to the examination period. The decision is binding for all students who intend to take the particular module examination. For scheduled examination dates, the regulations stipulated in section 18 (2) apply.

(5) If other types of examination have been determined, the examiner is to determine the schedule of examinations in the first quarter of the course concerned and is to notify the examination board.

Section 17 Admission to module examinations

(1) Students are to register for examinations within the registration period determined by the examination board using the electronic registration/withdrawal system provided by the Office of Student and Examination Services. If necessary, students may alternatively submit a written registration request to the Office of Student and Examination Services. Students are required to verify that their registration was properly recorded by consulting the appropriate registration lists. Only registered students may take part in an examination.

- (2) Students may only be admitted to an examination if they
1. are enrolled or registered at Cologne University of Applied Sciences as current students
 2. are cross-registered students pursuant to section 52 (1 and 2) HG and have neither taken nor registered for an examination in the subject concerned as regular students.
- (3) Students may be required to pass other module examinations in order for them to be admitted to a module examination. In addition, students may be required to provide proof of having participated in or having successfully completed internships in order to be admitted to the concluding part of a module examination. This is to be determined by the examiners. Additional information is available in section 24 and the curriculum (annex).
- (4) The optional required modules (*Wahlpflichtmodule*) in which the student intends to take an examination and which are stated in the examination registration become binding with the registration. For all other relevant matters, the regulations set down in subsection 6 apply.
- (5) Students are required to include the following documents with the registration or hand them in by a date set by the examination board, unless they have already done so at an earlier point in time:
1. proof of having met the admission requirements stated in subsections 2 and 3
 2. a statement on previous relevant examination attempts as well as on previous endeavors to take the Master's examination or another final examination in the same program.
 3. a declaration on whether the student objects to the presence of an audience during oral examinations
- If the examinee cannot duly submit one of the documents required according to sentence 1, the examination board may allow him/her to provide the corresponding proof in a different manner.
- (6) Students may revoke the registration for a module examination in writing with the Office of Student and Examination Services or - if possible - via the electronic registration/withdrawal system provided by the Office of Student and Examination Services up until seven days prior to the set examination date. In this case, students will not be charged with an additional examination attempt.
- (7) Admission to a module examination is to be decided upon by the chairperson of the examination board and, in cases of doubt, the examination board itself.
- (8) Admission is to be denied if
- a) the student does not meet the requirements stated in subsections 2 to 4
 - b) the examinee fails to submit all documents and does not submit them by the date set by the examination board, or
 - c) the examinee has irreversibly failed a corresponding examination in a comparable program or has irreversibly failed a Master's or other type of final examination in the same degree program within the jurisdiction of the German constitution.

In all other cases, admission is only to be denied if the examinee has, within the jurisdiction of the German constitution, lost the right to take examinations in the same program by having failed to meet a deadline for retaking examinations.

Section 18 Conduct of module examinations

- (1) For the module examinations specified in sections 19 and 20, normally one examination date per semester is to be scheduled. The examinations are to be held within the examination periods stipulated by the examination board and to be announced at the beginning of the semester or towards the end of the previous semester. No courses are to be held during the examination period.

- (2) Students are to be informed of the individual examination dates and their admission to the examinations at least two weeks prior to the examination concerned. Posting the information on the corresponding bulletin board is deemed sufficient.
- (3) Upon request, students are obliged to identify themselves with an official photo ID.
- (4) If a student substantiates – by submitting a medical certificate or in a different manner - that he/she is not capable of completely or partly taking the examination or assessment in its intended form due to a permanent disability or chronic disease pursuant to section 3 of the German Act on Equal Opportunities for Disabled Persons (*Behindertengleichstellungsgesetz*), the chairperson of the examination board may extend the time frame allotted for writing an examination or the deadline for taking an examination. The chairperson may also allow the student to take an equivalent examination in a different form. If several equivalent ways of offsetting a disabled person's disadvantage are considered suitable, the chairperson of the examination board is to decide on the type, date and duration of the examination at his/her discretion after having duly considered all circumstances. In exceptional cases, sentences 1 to 4 also apply to persons with temporary health impairments.

Section 19 Written examinations

- (1) In written examinations the examinee is to prove that – within a limited time frame and with limited resources – he/she is capable of identifying and correctly solving problems stemming from areas covered by the module by means of common scientific methods of his/her subject field.
- (2) A written examination is to be held under supervision. The examiner is to decide whether students may use additional resources.
- (3) A written examination is normally drawn up by one examiner only. In specific cases, especially when a module examination covers several subject fields, the examination may also be drawn up by more than one examiner. In such a case, the examiners jointly determine prior to the examination how the individual elements of the examination shall be weighted.
- (4) If a written examination is made up of more than one component, the examiner or the examiners are to previously define the point scheme which determines how the individual components form the overall grade for the written examination. It is not permissible to separately grade the individual components. If several examiners are involved in a written examination, they are to evaluate the examination jointly.
- (5) Examinations which conclude a degree program and examinations whose passing is a prerequisite for continuing a degree program are to be evaluated by at least two examiners. If the individual evaluations of a written examination differ from each other, the grade is determined by the arithmetic mean of the individual grades. Oral examinations are to be held by more than one examiners or by one examiner in the presence of a competent co-examiner.

Section 20 Written multiple-choice examinations

- (1) Written examinations may be completely or partly held as multiple-choice examinations. In multiple-choice examinations, students are asked to answer written questions under supervision by selecting the correct answers from a list of suggested solutions. Multiple-choice examinations may be held in modules suitable for this type of examination upon request by the examiners and with approval of the examination board.

- (2) The questions asked in multiple-choice examinations are to target the knowledge and skills taught in the module concerned and need to ensure reliable examination results.
- (3) It is the examiners' responsibility to determine the examination questions and the suggested solutions (examination exercises). It is to be recorded in writing which of the suggested solutions are accepted as correct answers.
- (4) The evaluation of a written examination is to include the following information:
1. The number of questions asked and the number of questions answered correctly by the examinee,
 2. the minimum number of questions required to be answered correctly in order to pass the examination,
 3. in case the examination has been passed, the percentage by which the number of correctly answered questions exceeds the minimum requirements,
 4. the grade obtained by the student.
- (5) When correcting the examinations, examiners are to pay attention as to whether a frequent occurrence of wrong answers to a specific question might indicate that the question was worded incorrectly. If it is determined after the examination that individual questions or possible solutions are erroneous, the examination exercises concerned will not be factored in. As a consequence, the number of examination exercises is to be reduced. This reduced number of exercises is to form the basis of the evaluation. Reducing the examination exercises may not put students at a disadvantage.
- (6) Examinations held using electronic equipment are to be treated like written examinations.

Section 21 Oral Examinations

- (1) Oral examinations are to be held in the presence of an examiner and a competent co-examiner (section 9 (1)) or in the presence of several examiners (panel examination) as group examinations or individual examinations. If an examination covers several subject fields, every examinee will on principle be examined by only one examiner in each subject field. Prior to grading the examination, the examiner is required to consult with the co-examiner or the other examiners.
- (2) A written record of the essential topics and the results of the examination, in particular facts that are essential to the grading of the examination, is to be kept. The grade is to be reported to the students after the examination.
- (3) Students who intend to take the same examination in a different examination period may be present at the examination as audience, provided that there is enough space and that no examinee did object to this provision when he/she registered for the examination. Students may neither be present during the examiners' consultation nor during the announcement of examination results.

Section 22 Other types of examination

- (1) Besides written and oral examinations, other types of examination may be applicable for module examinations, in particular presentations, project papers, written outlines and presentations of case studies or a different proof of academic performance, which may include active participation, written outlines and/or presentations of exercises completed in laboratories or tutorials.
- (2) Other types of examination are usually evaluated by one examiner, unless one of the provisions stated in section 19 (5) applies.

(3) All types of examination stated above are to determine whether the examinee is capable of independently solving and professionally presenting a practice-oriented assignment by means of verbal communication within a given time frame, using scientific and subject-related methods. The duration of an oral presentation or an additional written outline is to be determined by the examiner at the beginning of the semester. Minutes are to be kept about facts that are essential for the grading of an oral presentation. The grade is to be announced to the examinee one week after the oral examination at the latest.

III. Curriculum

Section 23 Modules and completion of the program

(1) In all compulsory modules (required and optional required modules), module examinations as described in sections 19 – 22 are to be held. The program's modules are listed in section 24; the corresponding types of examination can be found in the module catalog, unless individually determined by the examination board (section 16 (4); sentence 1). Modules and courses of the Master's program can be selected according to the curriculum. Additional information is available from the module catalog.

(2) The program schedule, the examination procedures and the curriculum are to be set up in such a way that it is possible for students to have taken all examinations required according to section 5 (1) by the end of their fourth semester.

(3) The examinee may take examinations in more modules than the ones needed to gain the required number of credits (additional modules). The results of these additional examinations may be listed on the examination certificate upon request of the examinee. However, they are not accounted for in the calculation of the final grade.

Section 24 Module examinations

Students are required to take module examinations in the following subjects:

1. Industrial Communications
2. Information and Network Security in Industrial Automation
3. Integration of Technical and Business Information Systems
4. Modeling and Simulation of Technical Processes
5. Advanced Process Control and Optimization
6. Technical Project Planning and Software Engineering
7.
 - a) Case Study: Industrial Communications & Industrial Security I (ICIS I)
 - b) Case Study: Industrial Communications & Industrial Security II (ICIS II)
 - c) Case Study: Vertical Integration I (VI I)
 - d) Case Study: Vertical Integration II (VI II)
 - e) Case Study: Modeling, Simulation, Control and Optimization I (MSCO I)
 - f) Case Study: Modeling, Simulation, Control and Optimization II (MSCO II)
8. Master's thesis.

The examinee is required to select three out of the six case studies listed above. Each case study is weighted with 10 ECTS credits.

IV. Master's thesis and final oral examination

Section 25 Master's thesis; purpose; topic; examiners

- (1) The Master's thesis is to be submitted as a written paper. It is to provide evidence that the examinee is capable of independently completing an assignment on a subject pertaining to his/her field of study within a given time frame by elaborating on subject-related specifics as well as on interdisciplinary contexts and by making use of scientific and subject-related methods. When writing their Master's theses, students should take an interdisciplinary collaboration into consideration. Examiners from other faculties may be chosen as thesis advisers if the topic of the thesis so allows.
- (2) The topic of the Master's thesis may be determined by every examiner who is appointed as such in accordance with section 9 (1). This examiner may also function as thesis adviser. Upon request of the examinee, the examination board may also appoint an honorary professor or a qualified adjunct lecturer as thesis adviser in accordance with section 9 (1) if it has been determined that no professor of the faculty can function as thesis adviser for the intended topic of the Master's thesis. Upon approval by the chairperson of the examination board, students may write their Master's thesis at an institution outside the institution of higher education if this institution provides sufficient advice and assistance. Students are to be given the opportunity to suggest topics for their Master's thesis.
- (3) Upon request, the chairperson of the examination board is to ensure that an examinee is provided with a topic for the Master's thesis in time.
- (4) A Master's thesis may also be written as part of a joint team project if the individual student's contribution to be evaluated as examination is clearly distinguishable and can be assessed accordingly and if it complies with the requirements stated in subsection 1. In order to verify a student's contribution, aspects such as passages, page numbers or other objective criteria allowing for a clear distinction are to be indicated.
- (5) The Master's thesis is to be written in English.

Section 26 Admission to the Master's thesis

- (1) Students are admitted to the Master's thesis if they meet the admission requirements stated in section 17 (2 and 5) and have, pursuant to section 12, obtained a total of 60 credits in the examinations required in accordance with section 24.
- (2) The registration for the Master's thesis is to be addressed in writing to the chairperson of the examination board and to be submitted to the Office of Student and Examination Services. Students are required to submit the following documents along with their registration, unless they have already done so:
 1. proof of having met the admission requirements stated in subsection 1,
 2. statement on previous attempts to write a Master's thesis or another final examination and on attempts to take the Master's examination.
 3. a statement on which examiner is willing and able to prepare the topic of the Master's thesis and to function as thesis adviser, and
 4. the suggested topic of the Master's thesis.
- (3) Students may revoke the registration for the Master's thesis in writing up until the day the decision on admission is announced. In this case the registration will not count as a failed attempt.
- (4) The chairperson of the examination board decides on the admission to the Master's thesis. In cases of doubt, the decision lies with the entire examination board. Admission is to be denied if
 - a) the examinee does not meet the requirements stated in subsection 1, or
 - b) the examinee fails to submit all documents, or

c) within the jurisdiction of the German constitution, a final thesis written by the student has been evaluated as “insufficient” and may not be written again, or if the student has irreversibly failed one of the examinations stated in subsection 2, phrase 2, no. 2.

In all other cases, admission is only to be denied if the examinee has, within the jurisdiction of the German constitution, lost the right to take examinations in the same program by having failed to meet a deadline for retaking examinations.

Section 27 Assignment of the topic and writing the Master’s thesis

(1) The topic of the Master’s thesis is to be assigned by the chairperson of the examination board. The time of assignment is to be the day on which the chairperson of the examination board informs the student of the topic of the Master’s thesis assigned by the thesis adviser; the time of assignment is to be put on record.

(2) Students have 4 months to write the Master’s thesis (starting with the time of assignment to the day of submission). The topic and assignment must be designed in a way that allows for the Master’s thesis to be completed within this time frame. The Master’s thesis may be submitted up to six weeks prior to the submission deadline. In exceptional cases, the chairperson of the examination board may extend the deadline of submission by up to six weeks if the student concerned submits a request prior to the deadline, in which he/she explains the reasons for extending the deadline. The thesis adviser is to be consulted on the request.

(3) The main part of the Master’s thesis is not to exceed 100 pages.

(4) Students may withdraw from a topic of their Master’s thesis only once and only within the first four weeks of the assigned time frame. They are not required to state a reason for doing so. If a student undertakes a second attempt to write a Master’s thesis in accordance with section 14 (2), the student is only permitted to withdraw from the thesis if he/she did not do so during the writing of his/her first Master’s thesis.

(5) If a student is physically disabled, the regulations stated in section 18 (4) apply.

Section 28 Submission and evaluation of the Master’s thesis

(1) By the submission deadline, students are to submit four hardcover copies of their Master’s thesis and one electronic copy in one of the common word processing formats to the chairperson of the examination board, or at a location determined by the chairperson. Submitting the thesis by means of telecommunication is not permissible. The time of submission is to be put on record; if the thesis is submitted by mail, the decisive criterion is the point of time at which the thesis is submitted to the postal service. When submitting the thesis, the student is required to declare in writing that he/she has independently written the thesis – in case of a joint team project his/her part of the thesis, which has been marked accordingly – and has used no other sources and means than the ones indicated. In case of quotations sources are to be identified. Moreover, the regulations on cheating as stated in section 15 (3) apply.

(2) The Master’s thesis is to be evaluated by two examiners. One of the examiners is to be the thesis adviser. The other examiner is to be appointed by the examination board. If section 25 (2) sentence 3 applies, he/she must be a professor. If the examiners’ evaluations differ from each other and the divergence of both grades is less than 2.0, the grade for the Master’s thesis is the arithmetic mean of the two grades. If there is a divergence of 2.0 or more, the examination board is to appoint a third examiner. In this case, the

grade for the Master's thesis is the arithmetic mean of the two better grades. However, the Master's thesis can only be graded "sufficient" or better if at least two of the grades are "sufficient" or better.

(3) Students are awarded 30 credits for passing the Master's thesis and the final oral examination in accordance with section 12.

Section 29 Final oral examination (*Kolloquium*)

(1) The final oral examination complements the Master's thesis. It is to be evaluated as an independent examination and is to be held within six weeks after the submission of the Master's thesis. It is to determine whether the examinee is capable of orally presenting and independently justifying

- the findings of the Master's thesis,
- its scientific and methodological fundamentals,
- inter- and
- multidisciplinary contexts,

and of assessing the thesis' significance for practice.

(2) Students may only be admitted to the final oral examination if they

1. have passed all module examinations
2. are enrolled or admitted as students or auditors in accordance with section 52 (2) of the North Rhine-Westphalia Higher Education Act and
3. have obtained a grade of at least "sufficient" for their Master's thesis.

(3) Students are required to submit a written registration request for the final oral examination to the Office of Student and Examination Services. They are also required to submit proof of having met the admission requirements stated in subsection 2, unless the Office of Student and Examination Services is already in possession of such proof. In accordance with section 26, students may submit a registration request for the final oral examination along with their application for admission to the Master's thesis; in this case, students are admitted to the final oral examination as soon as all required proof and documents have been submitted to the Office of Student and Examination Services.

(4) The final oral examination is normally to be held and evaluated by the examiners of the Master's thesis. If section 28 (2) applies, the final oral examination is to be held by those examiners whose individual evaluations were used to calculate the grade for the Master's thesis.

(5) The duration of the final oral examination is approximately 45 minutes. The provisions laid down for oral examinations (section 21) apply accordingly.

(6) The final oral examination may be retaken once.

(7) In accordance with section 12, a total of 30 credits are awarded for passing the Master's thesis and the final oral examination. The grade is determined by the individual evaluations for the oral and written examination. The weighting for Master's thesis and final oral examination is 2 to 1.

V. Results of the Master's examination

Section 30 Results of the Master's examination

(1) The examinee has passed the Master's examination if he/she has obtained 120 credits. This requires students to have passed all required module examinations and to have obtained a grade of at least "sufficient" for the Master's thesis and the final oral examination.

(2) The examinee has failed the Master's examination if one of the examinations stated in subsection 1 has been irreversibly evaluated as "insufficient" or is irreversibly deemed "insufficient". Students are to be notified of having failed the Master's examination. This notification is to include information on legal remedies. After the student's removal from the register of students, the chairperson of the examination board will upon request issue a certified document listing all examinations and assessments taken by the student and their respective grades, as well as the examinations missing in order for the student to complete the Master's examination. This certification must include a statement that the student has irreversibly failed the Master's examination. Upon request, the chairperson of the examination board will issue a document listing only the completed examinations and assessments and their respective grades.

Section 31 Examination certificate; final grade

(1) Graduates are to receive a certificate on the passed Master's examination without delay, if possible within four weeks after the last examination. This examination certificate is to include the grades and credits for all module examinations, the topic of the Master's thesis, the grades and credits for the Master's thesis and the final oral examination, the final grade for the Master's examination and in case of transfer credits, the name of the institution where the examination was taken.

(2) The final grade for the Master's examination is determined by the average of the grades for the module examinations, the Master's thesis and the final oral examination, which have been weighted by the corresponding credits.

If the examinee has completed more courses than necessary and passed them with a grade of at least "sufficient", those grades that the examinee has specified for this purpose are to be included in the calculation of the final grade. All other courses are to be listed as additional courses.

(3) As stated in section 23 (3), grades for additional courses are not accounted for in the calculation of the final grade.

(4) The examination certificate is to be signed by the chairperson of the examination board and is to bear the date of the day on which the last examination was completed.

(5) Graduates are to receive their Master's certificate (*Masterurkunde*) along with the examination certificate. The Master's certificate bears the same date as the examination certificate. The Master's certificate certifies that the Master's degree has been awarded in accordance with section 2 (4).

(6) The Master's certificate is to be signed by the dean of the Faculty of Computer Science and Engineering Science and the chairperson of the examination board and is to bear the seal of Cologne University of Applied Sciences.

(7) In addition to the Master's certificate and the examination certificate, graduates are to receive an English-language diploma supplement, which corresponds to the guidelines and agreements of the German Rectors' Conference.

VI. Final provisions

Section 32 Inspection of examination papers

After having taken a module examination or having completed the Master's thesis and the final oral examination, the examinee is, upon request, to be granted access to the written examination concerned, of – if available – the examiners' records related to the written examination and of the examination records of an oral examination. Access to a Master's thesis that was graded at least "sufficient" is to be granted only after completion of the corresponding final oral examination. Access to these documents is to be requested with the chairperson of the examination board within one month of the announcement of the grade for the module examination or within one month of the delivery of the examination certificate or the certification on irreversibly failing the Master's examination. The chairperson is to determine time and place of the inspection.

Section 33 Invalidity of examinations

(1) If a student cheated during an examination and the cheating was detected only after the delivery of the examination certificate and the certifications mentioned in section 30 (2) sentences 3 and 4 and section 31 (1 and 6) were issued, the examination board is entitled to retroactively amend the grades for those examinations during which the student cheated and to render the Master's examination failed or partially failed.

(2) If the requirements for admission to an examination were not met but the student did not attempt to cheat, and if this matter was detected only after the delivery of the examination certificate or the certification mentioned in section 30 (2) sentences 3 and 4 and section 31 (1 and 6) was issued, this shortcoming is offset by the student's passing of the examination. If the student deliberately effected a wrongful admission, the examination board is to decide on the legal consequences with due regard to the Administrative Procedures Act (*Verwaltungsverfahrensgesetz*) of North Rhine-Westphalia.

(3) The incorrect examination certificate or the incorrect certification mentioned in section 30 (2) sentences 3 and 4 and section 31 (1 and 6) is to be collected and reissued if necessary. A decision pursuant to subsection 1 is to be ruled out after five years have passed since the examination certificate or certification mentioned in section 30 (2), sentences 3 and 4 and section 31 (1 and 6) was issued.

Section 34 Entry into force; transitional regulations

(1) These Master's examination regulations enter into force as of September 01, 2013 and are to be published in Cologne University of Applied Sciences' official communication (*Amtliche Mitteilungen*).

(2) These examination regulations apply to all students who have enrolled or will enroll in the Master's program in Automation & IT at Cologne University of Applied Sciences in the winter semester 2013/2014.

(3) Upon request, these examination regulations will also apply to students who commenced their studies prior to the winter semester 2013/2014. Students in the Master's program in Automation & IT at Cologne University of Applied Sciences, Gummersbach Campus who commenced their studies prior to the winter semester 2013/2014 may complete the program in accordance with the examination regulations in place prior to September 1, 2013 until the end of winter semester 2018/2019. As of May 1, 2019 solely the Master's examination regulations stated in this document will apply to these students.

(4) Executed based on the resolution of the faculty council of the Faculty of Computer Science and Engineering Science at Cologne University of Applied Sciences of June 25, 2014 and after legal review by the President's Office of Cologne University of Applied Sciences on December 3, 2014.

Cologne, January 23, 2015

The President
at Cologne University of Applied Sciences

(Prof. Dr. Christoph Seeßelberg)

Annex:

Module catalog and curriculum

Translated on May 22, 2017 by Janina Höck, Translator at the Department of Academic Affairs at TH Köln – University of Applied Sciences.

This is a translation of the original German document. For all legal purposes, only the German version of the examination regulations shall be considered binding.