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Examination regulations for the program Communication Systems and Networks leading to the academic degree Master of Science at the Faculty of Information, Media and Electrical Engineering at Technische Hochschule Köln – University of Applied Sciences

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

By virtue of sections 2 (4) and 64 (1) of the North Rhine-Westphalia Higher Education Act (*Gesetz über die Hochschulen des Landes Nordrhein-Westfalen - Hochschulgesetz (HG)*) of September 16, 2014 (*Gesetz und Verordnungsblatt NRW* (GV. NRW), p. 547), as amended by sect. 2 of the law of September 1, 2020 (GV. NRW, p. 890), Technische Hochschule Köln (University of Applied Sciences) has adopted the following examination regulations by statute:

Contents

I	General information	3
Section 1	Applicability of the examination regulations; module catalog and study plan	3
Section 2	Objectives of the program; purpose of examinations; academic degree	3
Section 3	Admission requirements	3
Section 4	Standard program duration (<i>Regelstudienzeit</i>)	4
Section 5	Scope and structure of examinations; examination deadlines	5
Section 6	Examination Board	5
Section 7	Rights and duties of the examination board	5
Section 8	Decisions by the examination board	6
Section 9	Examiners and co-examiners	6
Section 10	Recognition of coursework and examinations	6
Section 11	Evaluation of examinations	7
Section 12	Credits in accordance with the ECTS (European Credit Transfer System)	8
Section 13	Evaluation of examinations in accordance with the ECTS grading scheme	9
Section 14	Retaking examinations	9
Section 15	Absence; withdrawal from examinations; cheating	9
II	Module examinations	10
Section 16	Objectives, scope and type of module examinations	10
Section 17	Admission to module examinations	11
Section 18	Conducting module examinations	12
Section 19	Written examinations	12
Section 20	Written multiple-choice examinations	13
Section 21	Oral examinations	14
Section 22	Other types of examinations	14
III	Study plan	15
Section 23	Modules and completion of the program, additional modules	15
Section 24	Module examinations	15
IV	Master's thesis and final oral examination	15
Section 25	Master's thesis; purpose; topic; examiners	15
Section 26	Admission to the Master's thesis	16
Section 27	Assignment of the topic and writing the Master's thesis	17
Section 28	Submission and evaluation of the Master's thesis	17
Section 29	Final oral examination	18
V	Results of the Master's examination	18
Section 30	Results of the Master's examination	18
Section 31	Examination certificate; final grade; diploma supplement	19
VI	Final provisions	19
Section 32	Inspection of examination papers	19
Section 33	Invalidity of examinations	20
Section 34	Entry into force; transitional regulations	20
	Annex 1: Study plan	23

I General information

Section 1 Applicability of the examination regulations; module catalog and study plan

- (1) These examination regulations are to administer teaching and learning as well as examinations of the Master's program in Communication Systems and Networks at the Faculty of Information, Media and Electrical Engineering at Technische Hochschule Köln (University of Applied Sciences). The Master's program is offered in cooperation with Bonn-Rhein-Sieg University of Applied Sciences. Students enrolled in the program may choose one or more of the specializations mentioned in annex 1. It is also possible to complete the program without a specialization.
- (2) Based on these examination regulations, TH Köln (University of Applied Sciences) establishes a study plan (see [annex 1](#)) and a module catalog. The module catalog is to outline the course contents, intended learning outcomes 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 study plan is to provide students with a guideline for adequately scheduling their studies.
- (3) A part-time option of the program is available. The faculty has created an alternative study plan for part-time students in accordance with sect. 62a (2) of the North Rhine-Westphalia Higher Education Act.

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

- (4) 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 studies in accordance with section 67 (4), phrase 1, No. 3 of the North-Rhine-Westphalia Higher Education Act).
- (5) Taking general study objectives into account (section 58 of the North Rhine-Westphalia Higher Education Act), the program leading to the Master's examination ([sect. 4](#)) is designed to convey research-oriented topics of the discipline on the basis of scientific findings.
- (6) The Master's program is consecutive to the Bachelor's programs in Electrical Engineering and Computer Engineering offered by TH Köln (University of Applied Sciences) and to the Bachelor's program in Computer Science offered by Bonn-Rhein-Sieg University of Applied Sciences.
- (7) The Master's examination ([section 5](#)) is to determine whether students have acquired further specialized knowledge required to exercise work in their profession independently (employability) and are prepared to assume social responsibility in a globalized world (global citizenship). It is also to determine whether they are capable of independently exercising work and conducting research on the basis of scientific findings and methods.
- (8) By passing the examinations listed in [section 5](#), students will have completed a scientific degree program, qualifying them to exercise work in the designated profession. Based on the successful completion of all examinations, the academic degree "Master of Science" is awarded in accordance with the regulations stated hereinafter.

Section 3 Admission requirements

- (1) Admission to the program requires a university degree (Bachelor of Science or higher) with a final grade of 2.3 ("good"; German grading system) in the field of technology and engineering worth at least 210 credits (sect. 12) in accordance with the European Credit Transfer System (ECTS). At least 110 credits must have been accumulated in the following fields: mathematics,

physics, electrical engineering, computer science. Other suitable programs are also considered. The Examination Board is to decide on the suitability of a program.

- (2) Additionally, English language proficiency (B2 level of the Common European Framework or Reference for Languages or equivalent) is required. Appropriate proof is to be submitted at the time of enrollment. Depending on the individual module selection, it is possible to pursue the program entirely in English. Students who select modules offered in German are expected to have German language proficiency on DSH 2 level (German Language Proficiency Test for Admission of Foreign Students). Supporting documents confirming the required language proficiency may be an admission requirement for individual courses and module examinations.
- (3) In exceptional cases, students may be admitted to the Master's program prior to having met the admission requirements stated in subsection 1 if they can provide proof of meeting the requirements within six months of the day of enrollment. If applicants do not meet all requirements stated in subsection 1, they may be admitted on the condition that they have successfully completed certain courses from Bachelor's programs before registering for the Master's thesis. The nature and scope of these conditions are individually determined by the examination board based on the courses completed by the applicant in his/her undergraduate program.
- (4) 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 considered. Moreover, selection interviews may be conducted to determine a student's aptitude or motivation.
- (5) Applicants participate in a selection process. Based on the documents submitted as part of the application, the following criteria will be reviewed and assessed during the selection process:
 - A) Content of the previous degree program and its suitability
 - B) Previous coursework and examinations
 - C) Academic and professional background
 - D) Relevance of previous professional experience for the Master's program (if applicable)
 - E) Personal motivation to pursue the Master's program
- (6) Admission is to be denied if the applicant has (within the jurisdiction of the German constitution) permanently failed or lost the right to take an examination in the chosen program and if this examination is mandatory according the examination regulations. This also applies to programs whose content has strong similarities to that of the program described in these examination regulations.

Section 4 Standard program duration (*Regelstudienzeit*)

- (1) The standard program duration for students enrolled in the full-time program (annex 1) is three semesters. In compliance with the European Credit Transfer System (ECTS), students are awarded a total of 90 credits (section 12). The standard program duration includes the examination period.
- (2) Part of the coursework and examinations may be taken at a university abroad (semester abroad). Details on this matter are set down in the *Richtlinien zur Anerkennung von im Ausland an einer Hochschule erbrachten Leistungen* (Guideline for the recognition of coursework and examinations taken at universities abroad) in its current version. The guidelines were established by the faculty council.
- (3) New first-year students can enroll in the summer and in the winter semester.

Section 5 Scope and structure of examinations; examination deadlines

- (1) The program is divided into individual modules. Detailed information on the structure of the program can be found in section 23 and the curriculum (annex). A student's successful completion of the program is to be determined by the examinations taken throughout the program (module examinations) as well as the 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 according to the study plan.
- (3) The study plan, the examination procedures and the study plan are to be designed in a way that makes it possible for students to have taken all required examinations within the standard program duration. In accordance with section 26, students adhering to the study plan are to have registered for the Master's by the end of the penultimate semester.
- (4) 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. Respective requests are to be submitted in due time before the examination. This also applies if the examinee proves – by submitting a medical certificate or in a different manner – that he/she is in disadvantage due to a permanent physical disability or chronic disease.

Section 6 Examination Board

- (1) The Faculty of Information, Media and Electrical Engineering is to establish an examination board to be in charge of the administration of examinations and the arrangement of the duties entrusted to it by these examination regulations. The examination board is to be an independent body of the faculty.
- (2) The faculty council elects the members of the examination board, except the member listed under item e), and consists of eight members:
 - a) chairperson and vice chairperson selected from the pool of professors;
 - b) two additional members selected from the pool of professors;
 - c) one member selected from the pool of research assistants;
 - d) two members selected from the pool of students;
 - e) the director of the program at Bonn-Rhein-Sieg University of Applied Sciences
- (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 administration 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 upon request. It is to give advice on potential reforms of the examination regulations, the module catalog and the study plans. The examination board may transfer its regular duties (in particular decisions on requests for withdrawals or credit transfers) to

the chairperson or another member from the pool of professors 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) Sessions 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) Negative decisions of the examination board or its chairperson are to be reported to the respective student without delay. Prior to any action, he/she is to be granted the right to be heard, if necessary.

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 relevant for the examination. A person may only be appointed co-examiner if he/she has at least passed the corresponding Master's examination or a comparable examination or holds a comparable qualification (qualified co-examiner). Examiners are independent for examination purposes.
- (2) If an oral examination is offered by more than one examiner, students may suggest one of them as their examiner. (Supplementary oral exams, if available in this program, are exempt from this rule.) Students may also suggest an examiner to be his or her thesis adviser. If possible, a student's suggestion is to be considered.
- (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 student will be informed of 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 or before the topic of the Master's thesis is assigned. Posting the information on the corresponding bulletin board or on an electronic examination management system is deemed sufficient.

Section 10 Recognition of coursework and examinations

- (1) Coursework and examinations completed within the jurisdiction of the Convention on the Recognition of Qualifications concerning Higher Education in the European Region of April 11,

1997 (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 coursework and examinations required. The decision is to be made within six weeks of the submission of all required documents. If the recognition of such examinations and assessments is denied, the university is to issue a substantiated notification on this matter. If it has been proposed to reject the recognition request, the Executive Board may be called upon to review the decision.

- (2) Examinations and assessments completed in degree programs outside the jurisdiction of the Lisbon Recognition Convention are to be recognized as set down in subsection 1 upon request.
- (3) Achievements that are not part of a degree program may be recognized as coursework or examinations upon request if they are equivalent to the examinations and assessments required. Such achievements may only account for up to half of the total number of coursework or examinations required for the successful completion of the program.
- (4) For examinations and assessments that have been recognized, students are awarded the number of ECTS credits stated in the study plan (annex 1). In case of a partial recognition, the number of credits awarded is to be adjusted accordingly. Non-graded examinations taken at other universities or in other programs are to be recognized in accordance with subsections 2 and 3. They are to be identified accordingly on the examination certificate and are not accounted for in the calculation of the final grade.
- (5) Examinations and assessments completed in the same degree program or the same module at Technische Hochschule Köln - University of Applied Sciences are to be officially recognized.
- (6) The examination board, or a person commissioned by the examination board, is to decide in all cases laid out in subsections 1 to 5. In cases of doubt, it is to consult the examiners responsible for the individual modules.

Section 11 Evaluation of examinations

- (1) Examinations are to be evaluated in a differentiated and comprehensible manner by means of grades. Individual components of the overall evaluation may remain non-graded. In exceptional cases, non-graded modules are allowed. 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) Graded and non-graded modules are listed in sections 23, 24 and/or the study plan.
- (3) 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.

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

Figures:

up to 1.5	Grade: "excellent"
above 1.5 to 2.5	Grade: "good"
above 2.5 to 3.5	Grade: "satisfactory"
above 3.5 to 4.0	Grade: "sufficient"
above 4.0	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.

- (5) 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 as set down in sect. 4.
- (6) An examination is passed if it is graded "sufficient" or better. If a module examination is made up of several components (partial or individual examinations), the module is passed if all components are passed.
- (7) The evaluation of examinations is to be completed within six weeks of the examination. Students are to be informed of the results. Posting the information on the corresponding bulletin board or on an electronic examination management system 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 each module of the Master's program, enabling credit transfers in accordance with the European Credit Transfer System (ECTS). Credits are a quantitative measure of the overall 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 Master's program as laid down in the study plan amounts to 60 credits per academic year. One credit equals a student workload of 25 to 30 hours, thus the workload for students enrolled in the full-time program is 750 to 900 hours per semester during the lecture period and the semester break. This equals 32 to 39 hours per week for 46 weeks a year.
- (3) Students only receive credits if they have successfully completed a module. This means that students are awarded the total number of credits for every graded module examination, as defined in section 11 (2 and 6), they have passed with a grade of at least "sufficient" irrespective of the grade received for the examination. A total of 90 credits is required to successfully complete the Master's program.
- (4) An overview of the number of credits assigned to the individual modules and to the Master's thesis as well as final oral examination is provided in the study plan ([annex 1](#)). More detailed information can be found in the module catalog.
- (5) Complying with [section 10](#), credits obtained in accordance with the ECTS at other institutions of higher education within and outside the jurisdiction of the German constitution are to be recognized with the number of credits assigned in the current program. In case of a partial recognition, the number of ECTS credits awarded is to be adjusted accordingly, cf. [section 10](#) (4, sentence 2)

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

In accordance with [section 31](#) (1) the examination certificate issued to students at the time of graduation includes a grade distribution table which indicates the relative position of the student's final grade. This grade distribution table is based on the requirements defined in the ECTS as well as on recommendations by the the Standing Conference of the Ministers of Education and Cultural Affairs (*Kultusministerkonferenz*) and the German Rector's Conference (*Hochschulrektorenkonferenz*).

Section 14 Retaking examinations

- (1) 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. It is recommended to retake failed examinations within one year of the first attempt.
- (2) An examination graded at least "sufficient" may not be retaken.
- (3) 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 component which he/she did not pass.

Section 15 Absence; withdrawal from examinations; cheating

- (1) An examination is deemed "insufficient" (5.0), or "not passed" for non-graded examinations, if a student fails to show up 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 within the foreseen time frame. Sentence 1 also applies accordingly if a student fails to submit his/her Master's thesis in due time.
- (2) The reasons for missing or withdrawing from an examination are to be immediately reported to the examination board in writing and are to be substantiated by the student. In case of sickness, students are required to submit a comprehensible medical certificate confirming their incapability of taking the examination. If a student withdraws during an examination, this is to be stated in the minutes and recorded in the minutes by the supervisor. If the examination board accepts the reasons given, the student is to be notified that he/she may again request to register for 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) or "not passed". Carrying non-permissible means may already be considered cheating. Non-permissible means are all documents, electronic resources, electronic devices or other resources that are not explicitly allowed to be used during the respective examination. Students are required to identify other people's intellectual property (text passages, images, statistics, etc. by other authors from offline or online sources) adopted in their written papers or examinations as quotations (also refer to the *Richtlinien des Präsidiums der TH Köln zur Sicherung guter wissenschaftlicher Praxis und zum Umgang mit wissenschaftlichem Fehlverhalten* (Guideline by TH Köln's Executive Board on the assurance of good scientific practice and handling of academic misconduct) of January 8, 2016 in its current version. If any solution artifacts (e.g. program codes, technical drawings, technical or scientific models and simulations) developed by others are adopted into own technical solution documents without indicating the source, this is considered plagiarism. Whether an examination may be retaken in cases of alleged plagiarism may be subject to meeting certain conditions, such as the successful participation in a seminar or workshop on academic writing.

- (4) Anyone who disrupts the proper course of an examination may be expelled from the examination by the examiner or the supervisor after having been given prior warning; in such a case, the examination concerned is to be graded “insufficient” (5.0) or “not passed”. The reason for the expulsion from the exam is to be put on record (minutes of the exam). In this case, the expelled student may request that the decision be reviewed by the examination board. This also applies to the decisions of an examiner or exam supervisor in cases described in subsection 3. In case of alleged cheating the chairperson of the examination board is entitled, without prejudice to the Administrative Procedures Act for North Rhine-Westphalia (*Verwaltungsverfahrensgesetz, VwVfG NRW*), to question the examinee to determine evidence on the matter. Examiners may be asked to participate in the questioning.
- (5) In case of repeated or otherwise serious cheating (e.g. major plagiarism, i.e. copying of longer text passages not marked as quotations, or the skillful concealment of plagiarism) the examination board may decide that the examination is deemed permanently failed and the examinee is to be removed from the student register.
- (6) In addition, acts of cheating may be considered an administrative offense and punished by a fine. Refer to section 63 (5) of the Higher Education Act (*Hochschulgesetz*) for details.

II Module examinations

Section 16 Objectives, scope and type of module examinations

- (1) The Master's program is divided into individual modules, each of which concludes with an examination. A module may extend over one or two semesters. The content of a module may be taught in one or more courses with different methods of teaching and study. Pursuant to sections 19 to 22, a module examination may be subdivided into several individual examinations of the same or different type. Based on the intended learning outcomes defined in the module description, examinations are to determine if and to which extend students have achieved the intended learning outcomes of a module. Students may be required to be familiar with relevant contents of previous modules.
- (2) Courses and examinations may also be held in English. Additional information is provided in sections 23 and 24, the study plan (annex 1) and the module catalog.
- (3) A module's examination type depends on the requirements of the respective module. Admissible types of examination are written or electronic examinations (sections 19 and 20) of 30 to 180 minutes duration, oral examinations (section 21) of 10 to 45 minutes duration per examinee and other types of examination (section 22) as well as combinations of the aforementioned types of examination.
- (4) 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.
- (5) In 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 examination type and modalities for each module, usually at the beginning of each semester unless this has already been set down the study plan or module catalog. 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. Pursuant to section 11 (5), the overall grade is the arithmetic mean of the individual evaluations, unless other weighting factors have been established.

- (6) The examination board normally determines the examination period for written and oral examinations in consultation with the examiners one month prior to the examination period for all students who intend to take the module examination concerned. The examination board's decision is to be uniform and binding. Posting the information on the corresponding bulletin board or on an electronic examination management system is deemed sufficient.
- (7) In case of other examination types, the examiner is to determine the examination schedule in the first quarter of the respective course and is to notify the examination board. The examiner is to announce the examination schedule within this period. Posting the information on the corresponding bulletin board or on an electronic examination management system or another system provided by the university is deemed sufficient. Section 18 (1), phrase 2 and 3 does not apply.

Section 17 Admission to module examinations

- (1) Participation in an examination requires prior admission to the examination. Students are to request their admission to 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. In exceptional cases, students may alternatively submit a written registration request to the Office of Student and Examination Services. Students are to verify that their registration was properly recorded by checking the electronic examination management system.
- (2) Only individuals who are enrolled at Technische Hochschule Köln (University of Applied Sciences) as students or auditors in accordance with section 52 (1) and (2) of the North Rhine-Westphalia Higher Education Act can register for examinations.
- (3) Students may be required to have passed preliminary assessments, lab courses, partial exams throughout the semester or other module examinations in order for them to be admitted to a module examination; see section 24 and the study plan (annex 1) for details.
- (4) (repealed)
- (5) In case of oral examinations, a statement whether the student objects to the presence of students of the same program as audience during oral examinations is to be submitted along with the registration request, or to be submitted by the deadline set by the Examination Board.
- (6) Students may revoke their registration for a module examination using the electronic registration/deregistration process provided by the Office of Student and Examination Services or, in exceptional cases, in writing with the Office of Student and Examination Services up until one week prior to the set examination date. By doing so, students will not lose an examination attempt.
- (7) Admission is to be denied if
 - a) the requirements stated in subsections 1 to 4 are not met, or
 - b) the examinee fails to submit all documents and does not submit missing documents by the date set by the examination board, or
 - c) The student has, within the jurisdiction of the German constitution,
 - permanently failed a Master's or other final examination in the same program or
 - a comparable examination in a program whose content has strong similarities to that of the program described in these examination regulations.

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 at a different institution, e.g. by having failed to meet a deadline for retaking examinations.

Section 18 Conducting module examinations

- (1) For the module examinations specified in sections 19 to 21, normally one examination date per semester is to be scheduled. However, each examination is to be offered at least once a year. With the exception of examinations which take place throughout the semester, examinations are to be held within the examination periods set by the examination board and are to be announced at the beginning of the semester or towards the end of the previous semester. Examinations are to be scheduled in such a way that they do not interfere with any courses. Examination procedures are to be documented in detail. (This applies in particular to oral examinations including presentations.)
- (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 or on an electronic examination management system is deemed sufficient.
- (3) Upon request, students are to identify themselves with a government-issued photo ID and their student ID card (MultiCa).
- (4) If a student – by submitting a medical certificate or in a different manner - substantiates that he/she is not capable of completely or partly taking the examination, coursework or admission test in its intended form or time frame 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 decides, after due consideration, if, how and to what extent a disadvantage compensation is appropriate. Applications for disadvantage compensation are to be submitted in due time (usually along with the registration for the exam at the latest and at least two months before the exam or by a date set by the chairperson of the examination board) along with all required supporting documents. The decision on the application is to be made within an appropriate time frame (usually within one month of the date of submission of the application or at least one month prior to the examination/the assignment of the topic). According to sect. 62b of the Higher Education Act, the Representative for Students with Disabilities and Chronic Diseases may be consulted prior to the decision. In exceptional cases, sentences 1 to 4 also apply to persons with temporary health impairments.
- (5) If a written or oral examination is the second re-take of a module examination, module component or individually assessed component or an examination which concludes a program, it is to be evaluated by at least two examiners.
- (6) According to sections 19 and 20, minutes of the examination are to be kept which are at least to include the names of the keeper of the minutes and supervisor and examinees, the start and end time of the exam as well as any unusual occurrences.

Section 19 Written examinations

- (1) In written examinations the student is to prove that – within a limited time frame and with limited resources – he/she is capable of identifying topics and tasks stemming from areas covered by the module by means of common scientific methods of his/her subject field and solving them correctly.

- (2) A supervisor is to be present during written examinations. 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 how the individual components of the examination shall be weighted prior to the examination; each examiner is to evaluate the entire written examination irrespective of the individual components and their weighting. Due to the special character of a subject field, the examination board may alternatively determine that an examiner shall only evaluate that part of a written examination that covers his/her subject field. In such a case, the examination is to be evaluated based on the previously determined weighting of the individual components Section 18 (5) is to remain unaffected.
- (4) Examinations which make use of electronic resources are permissible. They are treated like written examinations. An electronic written exam ("eKlausur") is a computer-based exam which is conducted using an exam software. It is drawn up, conducted and evaluated supported by information and communication technology. Electronic written exams are subject to technical feasibility and may be conducted in modules suitable for this type of examination upon request of the examiners and with approval of the examination board. Prior to the examination, students are given ample opportunity to get to know the electronic examination system. Electronic written exams are to be conducted in the presence of a person competent in the relevant field who is to produce a written record of the examination (sect. 18 (6)). It is to be ensured that the electronic data is kept and can be assigned to the individual examinees for the duration of the retention periods.

Section 20 Written multiple-choice examinations

- (1) Written examinations may be completely or partly conducted 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:
 - a) The number of questions asked and the number of questions answered correctly by the examinee,
 - b) the minimum number of questions required to be answered correctly in order to pass the examination,
 - c) in case the examination was passed, the percentage by which the number of correctly answered questions exceeds the minimum requirements,
 - d) the grade obtained by the student.
- (5) When evaluating 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) If only part of the examination is in multiple choice format, subsections 1 to 5 only apply to this part of the examination. If sentence 1 does not apply to an independent part of the examination, the regulations described in subsection 4 letters b) to d) do not apply.

Section 21 Oral examinations

- (1) With the exception of the cases defined in section 18 (5), oral examinations are to be held in the presence of an examiner and a qualified 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, each student will on principle be examined by only one examiner in each subject field unless section 18 (5) applies. 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 enrolled in the same program are to be given the opportunity to be present at oral examinations as audience, provided that there is enough space and that no examinee has objected to this provision when registering for the examination. However, no audience is allowed during the examiners' consultation or during the announcement of examination results.

Section 22 Other types of examinations

- (1) Besides written and oral examinations, other types of examination may be chosen for module examinations, in particular presentations, term papers, oral reports, project papers, concepts, learning portfolios or internship reports.
- (2) Other types of examination are usually evaluated by one examiner, unless section 18 (5) applies.
- (3) A term paper (e.g. case study or research paper) is to determine whether students are capable of independently completing a written technical assignment within a given time frame, using scientific and subject-related methods. The examiner is to determine the topic and length of the paper (e.g. number of pages of the main part) at the beginning of the semester.
- (4) An oral contribution (e.g. presentation, negotiation, mediation) is to determine whether the examinee is capable of independently solving and adequately presenting a practice-based assignment by means of verbal communication within a given time frame, using scientific and subject-related methods. The examiner is to determine the duration of the oral report at the beginning of the semester. Minutes are to be kept about facts that are essential for the grading of an oral contribution. The grade is to be announced to the student one week after the oral report at the latest.
- (5) A learning portfolio documents the students development of skills and competencies by means of presentations, essays, excerpts from internship reports, table of contents of term papers, lecture notes, to do lists, research reports and other presentations of coursework and products of learning. The documents assembled in the portfolio are called artifacts. A learning portfolio can only be considered an examination subject if it is accompanied by a student reflection (written, oral or video) on the significance of these artifacts for the learning objective which was previously announced by the examiner. As the semester proceeds and the learning portfolio is as-

sembled, the examiner will provide feedback on the development and/or artifacts. For the examination, the learning portfolio is revised based on the examiner's feedback. It is usually submitted in a digital format.

- (6) Term papers and oral contributions in the form of a joint team project may be treated as an examination if the individual student's contribution to be evaluated as an examination is clearly distinguishable and can be assessed accordingly. In order to verify the student's contribution, identifiers such as passages, subject fields, page numbers (for term papers) or other objective identifiers allowing for a clear distinction are to be indicated. If the focus of the intended learning outcome of the joint team project is on working together as a team, an overall evaluation of the team project is possible.

III Study plan

Section 23 Modules and completion of the program, additional modules

- (1) In all compulsory modules (required modules and required electives), students are to take module examinations as described in sections 19 – 22. The program's modules are listed in [section 24](#); the corresponding types of examination can be found in the study plan or module catalog, unless individually determined by the examination board ([section 16](#) (5); sentence 1). Modules can be selected according to the study plan. Additional information is available from the module catalog.
- (2) A student may take examinations in more modules than the ones needed to earn the required number of credits (additional modules). The results of these additional examinations may be listed on the examination certificate upon request of the student. However, they are not accounted for in the calculation of the final grade. If an examinee selects more than the required number of modules from the catalog of required electives and concludes them by passing the respective module examination, these are also considered additional modules.

Section 24 Module examinations

- (1) The language of instruction and examination is usually English.
- (2) The required modules are listed in annex 1.
- (3) Additionally, it is noted in the student's examination certificate or diploma supplement that she or he completed the program with a pre-defined specialization if she or he has successfully completed four of the modules listed for the respective specialization in annex 1 as required electives (PFM1-4).
- (4) Details on module examinations to be taken can be found in the current versions of the study plan (annex 1) as well as the module catalog.

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 student 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 may 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 any professor who may be appointed as examiner in accordance with section 9 (1). This examiner may also be the thesis adviser. Upon request of the student, the examination board may also name 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 is able to serve 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 university 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 a student is provided with a topic for the Master's thesis in time.
- (4) A Master's thesis may also be written as a team project if the individual student's contribution to be evaluated as examination is clearly distinguishable and can be evaluated accordingly and if it complies with the requirements stated in subsection 1. In order to verify a student's contribution, his or her passages, page numbers or other objective criteria allowing for a clear distinction are to be identified.
- (5) The Master's thesis may be written in English if endorsed by the Chairperson of the Examination Board and the main examiner.

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 45 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. The following documents are to be submitted at the time of registration, unless already submitted in the past:
 - a) proof of having met the admission requirements stated in subsection 1
 - b) a statement on previous attempts to write a Master's thesis or another final examination and on attempts to take the Master's examination;
 - c) the selection of required electives,
 - d) a statement on which examiner is willing and able to prepare the topic of the Master's thesis and to serve as thesis adviser, and
 - e) if applicable: the suggested topic of the Master's thesis.
- (3) Students may revoke their 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 student does not meet the requirements stated in subsection 1, or
 - b) the supporting documents are incomplete, 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 permanently failed one of the examinations stated in subsection 2 sentence 2 item b).

In all other cases, admission is only to be denied if the student has, within the jurisdiction of the German constitution, lost the right to take examinations in the same program, e.g. due to 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 five months to write the Master's thesis (day 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. 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. The main part of the Master's thesis is not to exceed 120 pages.
- (3) Students may withdraw from a topic of their Master's thesis only once and only within the first two weeks of the assigned time frame. They are not required to state a reason for their withdrawal. If a student undertakes a second attempt to write a Master's thesis in compliance with section 14 (1), 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.
- (4) Section 18 (4) applies accordingly.

Section 28 Submission and evaluation of the Master's thesis

- (1) Students are to submit two hardcover copies of their Master's thesis and one copy - which is also used for plagiarism checks - on an electronic data carrier, or in another digital format, in one of the common word processing formats to the chairperson of the examination board, or at a location determined by the chairperson by the submission deadline. Submitting the thesis by means of telecommunication (e.g. by fax) 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 team project his/her part of the thesis, which has been identified accordingly – and has used no other sources and means than the ones indicated. In case of quotations, sources are to be identified.
- (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) sentences 2 and 3 apply, 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 who pass the Master's thesis are awarded twenty-seven credits in accordance with section 12.

Section 29 Final oral examination

- (1) The final oral examination complements the Master's thesis. It is to be evaluated as an independent examination and is to take place within eight weeks of the submission of the Master's thesis. Its aim is to determine whether the student is capable of orally presenting and independently justifying the findings of the Master's thesis, its scientific and methodological fundamentals as well as 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
 - a) are enrolled at Technische Hochschule Köln (University of Applied Sciences) as students or auditors in accordance with section 52 (2) of the North Rhine-Westphalia Higher Education Act and
 - b) have received a grade of at least "sufficient" for their Master's thesis.
- (3) Students are required to file a written registration for the final oral examination with 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 register for the final oral examination when they apply for admission to the Master's thesis; in this case, students are admitted to the final oral examination as soon as all required evidence and documents have been submitted to the Office of Student and Examination Services.
- (4) The final oral examination is usually conducted and evaluated by the examiners of the Master's thesis. If section 28 (5) sentence 2 applies, the final oral examination is conducted 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) In accordance with section 12, students are awarded three credits for the final oral examination.

V Results of the Master's examination

Section 30 Results of the Master's examination

- (1) The Master's examination is considered passed if a student has earned 90 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 docu-

ment must include the information that the student has permanently 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; diploma supplement

- (1) Graduates are to receive a certificate on the passed Master's examination without delay, if possible within four weeks of the last evaluation. 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. Additionally, the specializations completed in accordance with sect. 24 (3) are mentioned on the examination certificate.
- (2) The final grade for the Master's examination is the average of the grades for the module examinations, the Master's thesis and the final oral examination, which have been weighted either by the corresponding credits or in another manner (defined in [section 24](#) or the study plan) If a student has selected more than the required number of modules from the catalog of required electives and has passed them with a grade of at least "sufficient", only the grades of the modules determined as required electives at the time of registration for the Master's thesis ([section 26 \(2\)](#)) will be considered for the calculation of the final grade.
- (3) In accordance with [section 23 \(2\)](#), grades for additional modules 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 taken.
- (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 compliance with [section 2 \(5\)](#).
- (6) The Master's certificate is signed by the dean of the respective faculty and by the chairperson of the examination board and bears the seal of Technische Hochschule Köln (University of Applied Sciences).
- (7) In addition to the Master's certificate and the examination certificate, graduates are to receive a diploma supplement in English, 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 student is, upon request, to be granted an inspection of the written or electronic 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 (if applicable). 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 permanently 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 is detected only after the examination certificate, the Master's certificate, diploma supplement or the document mentioned in section 30 (2) sentences 3 and 5 was issued, the examination board is entitled to subsequently amend the grades for those examinations during which the student cheated and to declare 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 examination certificate, Master's certificate, diploma supplement or the certification mentioned in section 30 (2) sentences 4 and 5 were 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) If necessary, the incorrect examination certificate, the Master's certificate and the diploma supplement or the incorrect document mentioned in section 30 (2), sentences 3 and 5 are to be collected and reissued. A decision pursuant to subsections 1 and 2 is to be ruled out if five years or more have passed since the examination certificate or document mentioned in section 30 (2) sentences 3 and 5 was issued.

Section 34 Entry into force; transitional regulations

- (1) These examination regulations enter into force on September 1, 2020 and are to be published in Technische Hochschule Köln's official communication (*Amtliche Mitteilungen*).
- (2) These examination regulations apply to all students who enroll in or apply for admission to the Master's program in Communication Systems and Networks at Technische Hochschule Köln (University of Applied Sciences) as of winter semester 2020/21. Additionally, subsection 3 also applies to all students enrolled in the Master's program in Communication Systems and Networks based on the examination regulations of July 8, 2013 (*Amtliche Mitteilung 07/2013*).
- (3) The examination regulations for the Master's program in Communication Systems and Networks of July 8, 2013 by Technische Hochschule Köln (University of Applied Sciences) (*Amtliche Mitteilung 07/2013* expire on October 31, 2023. Students who are subject to these examination regulations may complete their degree based on these examination regulations until they expire. Thereafter they will be subject to the examination regulations at hand. Upon request, students may transfer to the examination regulations at hand before this date.
- (4) The examination regulations are published on the basis of the resolution of the Faculty Council of the Faculty of Information, Media and Electrical Engineering at Technische Hochschule Köln (University of Applied Sciences) of July 1, 2020 and after legal review by the Executive Board of Technische Hochschule Köln (University of Applied Sciences) on December 16, 2020.

Cologne, January 4, 2021

President of Technische Hochschule Köln
(University of Applied Sciences)

Prof. Dr. Stefan Herzig

Annex:

Annex 1: Study plan

Annex 1: Study plan

Legend for all tables below:

Cr: ECTS credits

graded: module concludes with graded examination

ULP: module includes non-graded course-accompanying exams (e.g. lab course) as pre-requisite for taking concluding exams (section 17 (3))

a) Study plan (beginning of studies in the summer semester)

Module ID	Title of module	ULP:	graded	Cr
1st semester				
HIM	Advanced Mathematics	no	yes	5
BSN	Fundamentals of System and Network Theory	yes	yes	5
PFM1	Profile Module 1		yes	5
PFM2	Profile Module 2		yes	5
EL1	Elective 1		yes	5
PM	Project Management	no	no	5
2nd semester				
PFM3	Profile Module 3		yes	5
PFM4	Profile Module 4		yes	5
RP	Research Project	no	yes	10
EL2	Elective 2		yes	5
EL3	Elective 3		yes	5
3rd semester				
MAA	Master's thesis	no	yes	27
KOLL	Final oral examination	no	yes	3

b) Study plan (beginning of studies in winter semester)

Module ID	Title of module	ULP:	graded	Cr
1st semester				
HIM	Advanced Mathematics	no	yes	5
PFM3	Profile Module 3		yes	5
PFM4	Profile Module 4		yes	5
PM	Project Management	no	no	5
EL1	Elective 1		yes	5

Module ID	Title of module	ULP:	graded	Cr
EL2	Elective 2		yes	5
2nd semester				
BSN	Fundamentals of System and Network Theory	yes	yes	5
PFM1	Profile Module 1		yes	5
PFM2	Profile Module 2		yes	5
RP	Research Project	no	yes	10
EL3	Elective 3		yes	5
3rd semester				
MAA	Master's thesis	no	yes	27
KOLL	Final oral examination	no	yes	3

c) Specializations

Moduesl PFM 1-4 as listed below. To complete a specialization, all four modules must be taken from the list of the respective specialization.

Module ID	Title of module	ULP:	graded	Cr
Specialization Communication Systems				
ACC	Advanced Channel Coding	yes	yes	5
AMC	Advanced Multimedia Communications	yes	yes	5
DLA	Deep Learning Architectures	yes	yes	5
DSP	Digital Signal Processing	yes	yes	5
KRY	Cryptography	yes	yes	5
NGN	Next Generation Networks	yes	yes	5
ODUN	Optical and Wireless Transport Networks	yes	yes	5
RFSD	RF System Design	yes	yes	5
VAE	Virtual Acoustic Environments	yes	yes	5
Specialization Networks & Security				
AMC	Advanced Multimedia Communications	yes	yes	5
EBS	Embedded Security	yes	yes	5
IS	IT Security	yes	yes	5
KRY	Cryptography	yes	yes	5
KVS	Communication in Distributed Systems	yes	yes	5
NGN	Next Generation Networks	yes	yes	5
PET	Identification and Privacy Enhanced Technologies	yes	yes	5

Module ID	Title of module	ULP:	graded	Cr
SIN	Network Service Management	yes	yes	5
VPN	Virtual Private Networks	yes	yes	5
ZK	System reliability	yes	yes	5

Upon request, suitable modules which were completed at another university or in another program may be recognized for one of the program's specializations. The examination board is to decide on the recognition, if necessary, in consultation with teaching staff proficient in the respective subject field.

d) General electives catalog

For modules EL 1-3 all modules listed under c) may be selected. If endorsed by the examination board, additional technical modules from Master's programs offered by TH Köln's Faculty of Information, Media and Electrical Engineering and Bonn-Rhein-Sieg University of Applied Sciences' Department of Computer Science may also be selected.

Additionally, if endorsed by the examination board, one of the modules may be selected from the range of courses offered in other Master's programs. Upon request, this module may be substituted by several smaller modules if the total number of required credits are earned.

Upon request, suitable modules which were completed at another university or in another program may be recognized for as required electives EL 1-3. The examination board is to decide on the recognition, if necessary, in consultation with teaching staff proficient in the respective subject field.