

Translation of the Examination Regulations for the Master's Program (Master of Science) in Automation and Robotics

Effective from October 2019

Based on §2 clause 4 (read in conjunction with §64) Hochschulgesetz Nordrhein-Westfalen (Higher Education Act for the Land North Rhine-Westphalia) of September 16, 2014 (GV.NRW page 547), last amended by law of October 17, 2017 (GV. NRW page 806), Technische Universität Dortmund has issued the following regulations:

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I. General provisions

§1

Scope of the master's examination regulations

- (1) These examination regulations apply to the master's program in "Automation and Robotics" of the Faculty of Electrical Engineering and Information Technology at Technische Universität Dortmund. According to §64, clause 2 Hochschulgesetz Nordrhein-Westfalen (Higher Education Act for the Land North Rhine-Westphalia) they define the structures of the master's program.
- (2) The module descriptions include information on the individual elements of study, the respective syllabus and competences to be acquired. They are no inherent part of the examination regulations. They are determined by the faculty boards in charge and need to be communicated to the rector's board.

§2

Purpose of the program and goal of the examinations

- (1) The master's program Automation and Robotics is research-oriented. With its successful completion a further professional qualification is acquired. The goal of the degree course is to impart to students the necessary technical knowledge, skills and methods in the specialist field of robotics and automation, taking into account the demands of working life in such a way that successful students are enabled to carry out and evaluate complex engineering activities independently and with responsibility. In addition the degree course is laid out to form the scientific basis for a possible subsequent doctorate.
- (2) The aim of the master's examination is to show whether candidates are able to analyse problems from different areas out of automation and robotics, to break them down into suitable sub-problems, to solve the latter by applying scientific knowledge and findings and in this way to reach a complete and concise solution. Furthermore, the candidates should prove their capability to develop new scientific methods under supervision and instruction.

§3

Preconditions for admission

- (1) Prerequisite for a successful application to the Automation and Robotics Master's program is a course-related and equivalent special education according to the clauses 2 and 3, and a course-related aptitude according to clause 5.
- (2) A course-related special education can be attested by
 - a) a bachelor's degree in one of the following bachelor's programs of Technische Universität Dortmund: Electrical Engineering and Information Technology, Information and Communication Engineering, or
 - b) a bachelor's degree or a degree of a comparable program of three years duration (six semesters) at least in one of the following subjects: Electrical Engineering, Information Technology, Computer Science, Mechanical Engineering, Chemical Engineering or a comparable course. That degree has to be completed at a university or university of applied sciences in the scope of the German Basic Law, or
 - c) a bachelor's degree or a degree of a comparable program of three years duration (six semesters) at least. It is possible to get the degree at a university or university of applied

sciences outside the scope of the German Basic Law, provided that the board of examiners determines the equivalence of the degree and the program.

- (3) According to clause 2.a and 2.b the equivalence of the bachelor's degree is given, if the course includes the following scientific content:
 1. at least 18 credit points in the field of mathematics (Algebra / Analysis) and
 2. at least 12 credits in the field of Computer Science / Programming.
- (4) In examining the equivalence of the bachelor's degree the board of examiners shall evaluate in particular whether essential prerequisites were included in sufficient extent and level. Here an overall consideration instead of a schematic comparison shall be performed. Depending on this assessment, the board may issue admission with or without imposing further prerequisites, the latter related to the successful completion of missing coursework, or refuse admission. Prerequisites may be requested to at most 30 credit points and compliance must be proven at the latest by the beginning of the thesis.
- (5) In addition to the course-related special education according to paragraph 2 the study applicants have to show their course-related aptitude. For this purpose, the following criteria must be met:
 1. A course-related aptitude can be attested by a bachelor's degree according paragraph 2 graded at least "good" (2,0).
 2. The master's program is exclusively in English language, so sufficient knowledge of the English language is required. Is the mother tongue of the applicant not the English language or was the bachelor degree not obtained in a course at a University of one of the countries listed in Appendix A, sufficient English proficiency before taking up studies has to be proven by a certificate of English proficiency.. These language skills (equivalent to C 1 in the common European language Reference System) are considered to be present if the applicant has
 - submitted a certificate of English language proficiency by the following minimum TOEFL scores: paper based: 590, computer based: 243, internet based: 95, IELTS: 7.

The admission committee decides on the approval of other internationally accepted English language certificates (e.g. GRE, Cambridge Proficiency Certificate). Knowledge of the German language is no precondition. A regular language test is required in any case, bonafide certificates are not accepted.

§4

Master's degree

Based on the successful completion of the master's examination Technische Universität Dortmund – through the Faculty of Electrical Engineering and Information Technology – will award the degree "Master of Science" (M. Sc.).

§5

Credit point system

- (1) The program is based on a credit point system, which is compatible with the European Credit Transfer System (ECTS).

- (2) Each module is assigned, according to its study effort, a number of credit points. One credit point corresponds to one ECTS point. It is rewarded for an achievement requiring a workload of about 30 hours. Accordingly, 30 credit points need to be acquired per semester in general.
- (3) Credit points are being awarded after having successfully completed the respective modules.

§6

Standard period of study, scope and structures of the master's program

- (1) Including time for working on the master's thesis, the standard period of study is four semesters (two years).
- (2) In total, the master's program covers 3600 working hours and 120 credit points respectively. Courses fall into compulsory classes (mandatory courses, course lab, general education, project group, and master's thesis) and elective subject areas.
- (3) The program is composed of modules. A module must allow completion in at most two semesters. Modules offer well defined content and time frame, are self-contained subject fields totaling 5 credit points at the minimum.
- (4) The master's program can be entered in winter semester only.
- (5) The medium of instruction in all classes is English.
- (6) The structures of the master's program, the credit points, the examination forms, and program schedule are listed in the appendix.

§7

Elective modules and major field of study

- (1) From the elective courses of the master's program the students select one of the three following major fields of study:
 1. Process Automation
 2. Robotics
 3. Cognitive Systems.
- (2) During the second and third semester, altogether 45 credit points have to be earned from the elective courses. At least 30 credit points have to be earned from within the selected major field of study. The remaining elective modules will be individual elected by the candidates. The elective modules are adapted to the scope of their subjects and afford from 5 to 10 credit points. Depending on the students decision 5–9 elective modules have to be completed.
- (3) Precondition for selecting Process Automation as the major field of study is to complete successful the module "Process Automation".

§8

Practical courses

- (1) The practical courses of master's degree include in total 450 student work hours, which are divided into the module course lab (90 student working hours), which is to be completed in the first semester and the module project group (360 student work hours), which is to be completed in the third semester.
- (2) 3 credit points can be earned with the module course lab Details are described in the module descriptions.
- (3) 12 credit points can be earned with the module project group. Such a group will be conducted in a working team of students. Each project group comprises a report which has to be compiled as

individual item of each participant. Provision has to be taken that the individual work can clearly be distinguished in order to be used as rationale for grading during evaluation. Details are described in the module descriptions.

§ 9

Access to courses of a module and admission to courses with limited number of participants

- (1) Access to the courses of a module may be subject to certain conditions, in particular the successful completion of other modules. The individual admission requirements of the modules can be found in the module descriptions of the module handbook.
- (2) The courses of the Master program Automation and Robotics can be limited in number of participants for the reasons stated in § 59 paragraph 2 sentence 1 HG.
- (3) The limitation of the number of participants as well as a maximum number of participants for the respective courses shall be determined by the Faculty Council of the Faculty of Electrical Engineering and Information Technology in agreement with the participating faculties and will be announced in a suitable manner.
- (4) If the number of applicants exceeds the admission capacity, the Dean or one of his or her instructors or instructors with the participation of the Faculty Commission for Teaching and Studies regulates access at the request of the respective teacher, the candidates must be considered in the following order:
 1. Students who are dependent on attending the course at the time of their studies, provided that they have been enrolled in the Master's program Automation and Robotics at the Technische Universität Dortmund or have been admitted as second-handers pursuant to § 52 (2) HG.
First, students whose study plan has allocated the respective module in exactly the term in which they do apply, are considered to be dependent.
Second, students who apply during the last term of their studies or beyond the tentative time frame are considered to be dependent in case the credits gained will enable them to start the master thesis work.
 2. Students who are not required to attend the course at the time of their studies, provided that they have been enrolled in the Master's degree program in Automation and Robotics at the Technische Universität Dortmund or have been admitted as second-handers pursuant to § 52 (2) HG.
 3. Students admitted to the respective course as second listeners in accordance with § 52 (1) HG.
 4. Other students of the Technische Universität Dortmund, provided they meet the requirements for participation in the course.
- (5) If a selection is required within a group, the candidates must be considered in the following order:
 1. Students with long-term or permanent physical disability, chronic illness or nursing care (caring for children living predominantly in the household, care of the spouse, the registered partner or one or a straight line relative or first-degree relatives if this or this is in need of care).
 2. Students for whom it is mandatory to repeat a course in the relevant module.
 3. Students who have participated in all the courses recommended in the relevant Module Descriptions of the Module Handbook.

4. After the other criteria have been exhausted, the lot is decided.
- (6) The existence of the conditions related to the criteria in paragraph 5 (1), (2) and (3) shall be asserted by the candidates themselves in the course of the application process within specified published time limits to the dean.
- (7) Within the scope of the available resources, the Faculty of Electrical Engineering and Information Technology shall ensure that the students referred to in paragraph 4 (1) do not incur any or at most a time loss of one semester due to the limitation of the number of participants.

§10

Examinations and disadvantage balancing

- (1) Each module is completed by at least one module examination. Two topic-related elective modules can also be completed by a common module examination. The module combination in which a common module examination is possible are defined in the module descriptions. The module examination is performed graded or ungraded.
- (2) Students shall take the module examinations primarily in the form of written tests or oral examinations. The responsible lecturers may define other suitable forms of examinations upon approval by the board of examiners.
- (3) Form and content of the module tests are defined in the module descriptions of the module handbook. The exam dates are set by the chairman of the board of examiners. The examination dates and the names of the examiners are to be announced as early as possible, but not later than four weeks before the end of the semester. The registration for the module examinations must be made at least one week before the examination date. The initial registration for the examination has to take place at the latest at the end of the semester in which the course was provided assigned to the course schedule. Does the registration for the examination not take place within the next three semesters, the claim of examination expires, unless the candidate proves that he or she is not responsible for the failure.
- (4) Module examination dates have to be offered twice per year This scheme ensures that a candidate not having passed the exam the first appointment, may participate in the examination of the second appointment.
- (5) In modules which are completed by a module examination specific performances may be requested in the individual courses constituting preconditions for the completion of the module. Students shall take these performances in particular in the form of giving presentations, semester papers, specific practical examinations, written tests, and oral examinations. The performance may either be graded or rated as “pass” or “fail”. In order to participate in the module examination the candidate needs to provide evidence of having successfully completed all performances requested in this module.
- (6) The requirements of a study performance are in form and content well below the requirements of a test. Where the nature of the study performances is not defined in the module descriptions, it is made by the examiners at the beginning of the event known.
- (7) For module examinations in the written form, a processing time of at least one up to a maximum duration of three hours must be provided. The test duration is specified in the module descriptions. The exam will be carried out under supervision and are not public. Legal aid may be given no later than four weeks before the examination by the respective examiners. The results of the written examination will be given no later than eight weeks after the examination date, whilst requirements of data protection are observed.

- (8) Examinations can be performed wholly or partly in multiple-choice method. In particular, by using this method it has to be ensured that the examination is based on the knowledge and appropriate content from the modules and enable reliable testing results. For tests that are to be assessed by two examiners, the examination questions from both examiners are developed together. In the preparation of exam questions those responses which are accepted as correct have to be clearly determined.
- (9) An individual oral examination lasts at least 30 and at most 45 minutes. If group examinations take place the test period shall be extended accordingly. Oral examinations are conducted by several examiners or one examiner in the presence of a competent assessor or a qualified observer as a single test or as a group examination with a maximum of three students. The main results of the examination shall be recorded in a log. Before determining the grade, the examiner has to listen to the assessor or assessors. The result of the audit must be disclosed to the students directly after the the oral examination. Students who wish to take the same test at a later time will be admitted according to the spatial opportunities as listeners, unless the students to be tested do not agree. This permission does not extend to the consultation and announcement of the examination results. In case of interference or disturbance of testing these persons may be excluded from the examiner as a listener or listeners.
- (10) Examinations in written or oral form, with which a program is completed, and in repeated tests in their final failure when non compensatory ability is provided must be assessed by at least two examiners according to §12 (§65 clause 2, Hochschulgesetz).
- (11) For teaching subject (with exception of lectures) in which the specific teaching goals require a continuous and active participation of students (e.g. laboratory experiments, practical sessions, security briefings, case studies, discussion coaching) presence may be defined as mandatory. The responsible teaching person will impose this restriction in mutual agreement with the board of examiners and maintaining principles of proportionality. The ruling conditions will be checked with respect to each case. The specifics of the respective course have to be pondered against the rights of free studies and a decision has to be made if and in which scope mandatory presence is required to reach the teaching goal or if other means of learning, e.g.: self contained studies alone or in study groups, could yield the same effect. An infringement of the freedom of study, taking into account constitutional rationales, is justified only in this very strict set of preconditions. It is therefore illegitimate in any case to constitute obligatory presence in blanket and detached from the individual case. The detailed rules of presence with reference to the particular course will be disclosed to the students in appropriate form at the beginning of the course.
- (12) In case students substantiate by medical certificate that they cannot take an examination (entirely or partially) in the scheduled form or within the period fixed due to prolonged or permanent physical handicap or chronic disease the chairman of the board of examiners shall set an alternative form or period for the examination to be taken. In case of doubt the relevant person or office in charge of handicapped students' issues must be consulted. Examination procedures consider the legal maternity periods and the periods of parental leave as well as times absent due to the necessity to tend a material partner, a registered partner, or a first-degree relative or a person related by marriage of the first degree. Attests a student by a medical certificate that he or she is to prolonged or permanent physical disability or chronic illness unable due to take an examination in whole or in part, in the form provided or period, determines the chairman of the board of examiners in what form or other period, the module will be assessed. In case of doubt, the person or body responsible for questions about interests of disabled students (e.g. Dortmund disability and study center –

Dortmunder Zentrum Behinderung und Studium) is involved. Testing procedures take into account the statutory maternity leave periods and downtime by taking care of the household living, predominantly providing care children, the care of the spouse, registered partner / registered civil partner or a in a straight line relative or first degree by affinity, if this or that is need of care .

(12) The tests are conducted in English.

§ 11

Written examinations

- (1) Examinations in the form of a written exam must be assessed by at least one examiner in accordance with § 21 (1) and (2). If the written exam is the last possible attempt at repetition, or if the course is completed with the written exam, the thesis must always be graded by two examiners or one examiner. If the written exam is taken by two examiners or one examiner, each examiner will determine a single grade for the written exam in accordance with § 21 (1). The grade of the written examination to be determined according to the standard of assessment according to § 21 (7) is the arithmetic mean of the individual grades. However, the grade of the written exam may only be "sufficient" (4.0) or better or "passed" if both examiners have at least the individual grade "sufficient" (4.0) or "passed". If only one examiner rates the written exam as at least "sufficient" (4.0), the examining board will appoint a third examiner to evaluate the exam. If the third examiner is at least "satisfactory" (4.0), the grade of the written exam will be the arithmetic mean of the two better grades, otherwise the grade will be "insufficient" (5.0),
- (2) The duration of the written exam is at least one and not more than three time hours for module examinations. The duration of the exam is specified in the module descriptions of the module handbook.
- (3) The written exam is conducted under supervision and is not public.
- (4) The aids approved for the written examination will be announced at the latest four weeks before the examination.
- (5) The results of the written tests will be announced at the latest eight weeks after the date of the examination, whereby the requirements of data protection are to be observed. If it is the first examination date, the results must be announced in good time so that registration for the second appointment is possible, ie. H. at the latest two weeks before the second appointment.
- (6) Written examinations can be carried out in whole or in part in the answer-choice procedure. In particular, when using this procedure, care must be taken to ensure that the examination tasks are geared to the contents and required knowledge conveyed in the modules or the corresponding courses, and that they allow reliable examination results. In the case of examinations to be assessed by two examiners or one examiner, the examination questions are jointly developed by both examiners or one examiner. In the preparation of exam questions, it has to be decided which answers are accepted as correct.

§ 12

Oral exams

- (1) The oral examinations take at least 30 and at most 45 minutes for each student or student in module examinations.
- (2) Oral examinations are taken either by an examiner in the presence of a competent assessor or by two examiners or an examiner as group examinations with a maximum of three students or as

individual examinations. If the test is the last possible repeat test or the study is completed by the exam, the exam must always be graded by two examiners or one examiner.

- (3) If the oral examination is taken by an examiner, the examiner must hear the observer before setting the grade according to § 21 (1). If the oral examination is taken in front of two examiners or one examiner, each examiner will determine a single grade for the oral examination according to § 21 (1). The grades of the oral examination are determined from the arithmetic mean of the two individual grades in accordance with § 21 (7). If only one examiner assesses the oral examination as at least "sufficient" (4.0), the exam will be given to two other examiners or an examiner appointed by the Examination Board, without credit a failed attempt repeated.
- (4) The essential items and results of the oral test shall be recorded in a minutes. The result of the examination must be announced to the candidate following the examination.
- (5) Students who wish to undergo the same examination in a later examination period are admitted as listeners according to the spatial conditions, unless the candidate contradicts. The admission does not extend to the consultation and announcement of the examination result.
- (6) In the case of an influence or disturbance of the examination these persons can be excluded by the examiner as a listener.

§ 13

Coursework

- (1) In modules that conclude with a module examination, additional study credits may be required in the individual courses. These may be in particular: papers, chores, certified internship attempts, practical exercises, written or oral performance reviews, lectures or minutes. Course achievements can be graded or "passed" or "failed". Section 21 (4) lit. b does not apply. The prerequisite for participation in the module examination is the successful completion of all coursework required in this module. The required coursework must therefore all have been graded at least "sufficient" (4.0) or rated as "passed". Study achievements are evaluated by the examiner in the respective module.
- (2) The requirements of a study achievement are in form and content clearly below the requirements of a module examination. Insofar as the form in which a coursework is to be provided for a module is not defined in the module descriptions of the module handbook, it will be announced by the teacher or instructor at the beginning of the course.
- (3) Course achievements should prepare for the module examination. Since the content of an event may change over time due to technological advances, the fulfillment of this task is not guaranteed if there is too long a gap between successful completion of the coursework and module examination. Therefore, the Examination Board, in consultation with the examiners, determines the validity period of individual passed course achievements in a module and announces this by posting before the beginning of the corresponding course.

§14

Repeating examination performances, passing or failing the master's examination

- (1) Examinations can be repeated twice in case they have been rated or are considered as failed. Failing an elective module can be compensated by successfully completing another elective module. Examinations which have been passed successfully can not be retaken.
- (2) Notwithstanding clause 1, the master's thesis can be repeated once and as a whole.

- (3) The master's examination is passed when all 120 credit points earned through examinations as well as by the master's thesis have been acquired.
- (4) The master's examination as a whole is finally rated as failed when
 - a) the master's thesis has again been rated or is considered as failed after repeating it or
 - b) the candidate missed to acquire the required minimum number of credit points or
 - c) one compulsory module has finally been rated as failed or
 - d) the examination claim is extinguished according to §9 clause 3.
- (5) When the master's examination is finally rated as failed or when one examination performance is finally considered as failed the chairman of the board of examiners towards a written notification to the candidate. The notification shall include information on legal remedies. On request, the candidate may be issued a certificate on the examinations which have been successfully taken; it includes the information that this certificate is not intended for submission at other universities.

§15

Board of examiners

- (1) For the organization of examinations and for the tasks resulting from these examination regulations the Faculty of Electrical Engineering and Information Technology establishes a board of examiners. This board of examiners consists of members of all faculties that are taking part of the program.
- (2) A board of examiners consists of seven members, namely four members from the group of professors, one member from the group of academic staff, and two members from the group of students. The members of each group are being elected separately by the faculty board for a period of three years, members of the group of students for a period of one year. Re-election is permissible. Furthermore, the student advisor joins the board of examiners with no vote. The composition of the board of examiners will be announced by the Dean of the Faculty.
- (3) The board of examiners elects the chairman as well as the deputy chairman from the members of the group of professors. The faculty board elects representatives for the members of the board of examiners except for the chairman and her/his deputy. Re-election is permissible.
- (4) The board of examiners shall ensure that the provisions of the examination regulations are complied with and that examinations proceed as scheduled. It shall in particular be responsible for resolutions regarding objections to decisions made in the course of the examination procedure and for decisions on cross-faculty questions and problems. Moreover, the board of examiners shall report regularly, at least once a year, on the development of examinations and the periods of study. It shall make suggestions regarding the reform of examination regulations and the curriculum. The board of examiners may transfer current tasks (e.g. issues of validation, decisions to be made at short notice, special missions etc.) to the chairman; this does not apply to decisions on objections and to the report to the faculty.
- (5) The board of examiners shall have a quorum when, apart from the chairman or his/her deputy and a further member from the group of the professors, at least one more member entitled to vote is present. The board of examiners decides by simple majority. In the event of a tie the vote of the chairman decides. Student members do not participate in educational-academic decisions. These are in particular the assessment, approval, or accrediting of performances, the definition of examination questions, and the nomination of examiners and assessors.
- (6) Members of the board of examiners may be present at examinations.

- (7) Meetings of the board of examiners are non-public. Members of the board of examiners, examiners, and assessors are subject to official secrecy. In the event that they are not in state employment, the chairmen shall oblige them to secrecy.
- (8) Current business of the board of examiners is accomplished by the Central Examination Administration (Zentrale Prüfungsverwaltung).

§16

Examiners and assessors

- (1) The board of examiners appoints examiners and assessors according to the statutory provisions. It may transfer the appointment to the chairman of the board of examiners. Professors of the Technische Universität Dortmund and other authorised persons according to §65, clause 1 Hochschulgesetz Nordrhein-Westfalen may be appointed as examiner. A person having completed a diploma or master's examination in the corresponding subject or being able to prove relevant qualifications may be appointed as assessor.
- (2) Examiners shall carry out their activities as examiners independently.
- (3) Candidates may propose examiners for the master's thesis. Where possible, these proposals shall be taken into account; however, no claims may be based on a proposal made by a candidate.

§17

Accrediting performances, placement in higher semesters

- (1) Performances completed in the same course of studies at other universities within the scope of the German Basic Law are accredited without verification of equivalency.
- (2) Performances completed in other courses or studies or at institutions other than universities within the scope of the German Basic Law are accredited provided that the equivalency is verified and approved performances completed at universities beyond the scope of the German Basic Law are accredited on request provided that the equivalency is verified and approved. Equivalency is verified and approved when performances substantially comply with those of the corresponding course of studies at Technische Universität Dortmund in terms of content, scope, and requirements. Here an overall consideration and evaluation shall be carried out rather than a schematic comparison. Regarding the equivalency of performances obtained at foreign universities, the equivalence agreements approved by the Kultusministerkonferenz (Conference of Ministers of Cultural Affairs) and the Hochschulrektorenkonferenz (German Rectors' Conference) as well as agreements made within the scope of university partnerships shall be considered. Moreover, in case of doubt as to the equivalency the Central Office for Foreign Education (ZAB) may be consulted.
- (3) Credit points earned within the scope of ECTS are accredited when the necessary requirements are complied with. Before the students go abroad a written agreement shall be made between the student, a representative of the host university setting type and scope of the credit points to be accredited, unless the exchange takes place within a cooperation agreement.
- (4) For performances completed in state-approved distance learning programs or in distance learning units developed by the Land North Rhine-Westphalia in cooperation with other Länder and the State clauses 1 and 2 apply accordingly.
- (5) Applicants who are qualified to enroll in a higher semester due to a placement test according to §49, clause 12 Hochschulgesetz Nordrhein-Westfalen shall be accredited the knowledge and skills demonstrated in the placement test for the benefit of performances of their master's

examination. Statements made by the board of examiners in the diploma regarding the placement test are binding.

- (6) Credits, which are, in accordance with clauses 2 to 5, not equivalent, but which were performed in the scope of the German Basic Law or in a State which ratified the "Convention on the Recognition of Qualifications concerning Higher Education in the European Region" (Lisbon Recognition Convention of April 11, 1997) will then be credited if no substantial difference to the performance of the program is determined.
- (7) Relevant professional activities may be counted on practical courses.
- (8) For the purpose of counting performances and credits in the same or related courses not only passed, but also failed exams are taken into account
- (9) The board of examiners is responsible for accrediting performances according to clauses 1 to 8. Before making statements on the equivalency a competent subject representative shall be consulted.
- (10) In case the requirements of clauses 1 to 6 apply students have the legal right to their performances being accredited. Accrediting of performances which have been completed within the scope of the German Basic Law is carried out ex officio. Students need to present the documents necessary for accrediting.
- (11) If performances are accredited grades shall be transferred on-to-one and included in the final grade provided that the grading systems are comparable. In case of non-comparable grading systems the performances shall be commented as "pass". Accredited performances shall be indicated in the diploma.
- (12) Based on study and examination performances accredited according to the provisions in clauses 1 to 7 a maximum number of 60 credit points may be acquired.

§18

Non-attendance, withdrawal, deception, and infringement

- (1) An examination performance shall be deemed to be graded "insufficient" (5.0) when the candidate does not appear on the date of the examination without good reason or when he or she withdraws from the examination without good reason after the examination has begun. The same applies to written examinations which are not completed within the time permitted.
- (2) The reasons put forward for withdrawal or unexcused absence shall be given and substantiated to the board of examiners without delay by written notice. In case of illness of the candidate or of a child which is mainly being taken care of by the candidate a medical certificate is demanded. In case of illness of the candidate the medical certificate must comprise the medical findings and attest in a generally intelligible way the inability to take an exam. Should the board of examiners not accept the reasons put forward the candidate will be given written notice.
- (3) If a candidate attempts to influence the examination performance by deception (e.g. by using non-authorized aids, by using text passages without making them as a quotation, by copying from other examinees, etc.) the examination is graded "insufficient" (5.0). The respective examiner or the supervisory staff take the decision whether an attempt of deception must be assumed. If an attempt of deception according to sentence 1 is discovered during an examination by the supervisory staff the candidate may be disqualified from taking the respective examination. In this case the examination shall be graded "insufficient" (5.0). A candidate trying to disturb the correct procedure of the examination may, after admonition, be disqualified from continuing the examination by the examiner or supervisory staff. In this case the examination

performance concerned shall be graded “insufficient” (5.0). The respective reasons for the decision shall be put on record. In serious cases the board of examiners may disqualify the candidate from taking further examinations.

- (4) In examinations the board of examiners may demand a written statement from the candidate confirming that he or she has composed the document – in case of teamwork an accordingly marked part of the document – independently without having used any other sources and aids than those indicated in the text and that literal and analogous citations have been marked. §18, clause 9 remains unaffected.
- (5) The candidate may demand within a period of 14 days that decisions made according to clause 3 shall be reviewed by the board of examiners. Negative decisions shall be communicated to the candidate without delay; they shall be substantiated and must include information on legal remedies. The candidate shall be given the opportunity for a hearing before a decision is made.

I. Master’s examination

§ 19

Admission to the master’s examination

- (1) Students being enrolled in the master’s program Automation and Robotics or as guest auditors according to §52, clause 2 Hochschulgesetz Nordrhein-Westfalen are admitted to the examinations of the master’s program unless admission is refused according to clause 2.
- (2) Admission shall be refused if
 1. the candidate’s master’s examination in a master’s program in Automation and Robotics has finally been rated as failed or a module examination referring to the mandatory modules listed in the appendix or an examination in a related course of studies has finally been rated as failed or
 2. after having taken an examination in one of the aforementioned courses of studies a definitive and legally binding judgement regarding the student’s status of having finally failed has not yet been made due to a subsequent contestation of the board of examiners.

§ 20

Master’s examination

- (1) The master’s examination consists of written and oral examinations; students must acquire 90 credit points within the scope of these examinations. A further 30 credit points shall be acquired by the master’s thesis.
- (2) The modules to be studied as well as the corresponding credit points are listed in the appendix.

§ 21

Evaluation of examination performances, acquiring credits, grading

- (1) Grades for examinations are determined by the respective examiners. The following grading system shall be applied:
1 = very good = excellent result

- 2 = good = result that is considerably above average requirements
- 3 = satisfactory = results corresponding to average requirements
- 4 = sufficient = results that still meet the requirements despite their deficiencies
- 5 = insufficient = results that do not meet the requirements despite their deficiencies

For more differentiated assessment of examinations grades may be reduced or raised by 0.3; grades 0.7, 4.3, 4.7, and 5.3 are excluded, though.

(2) In consultation with the board of examiners, for examinations with tests that are not included in the final grade, the rating scale according to clause 1 is based on simplified scale as follows:

“passed” = a performance that satisfies the minimum requirements

“failed” = a performance that does not meet the requirements due to significant deficiencies.

(3) The number of credit points assigned to each module can be acquired when the module has been graded at least “sufficient” (4.0) or rated as “pass”.

(4) A written examination, which was conducted exclusively in the multiple-choice method, is considered passed if

1. 60% of the total score to be achieved has been achieved or
2. the obtained score is not more than 22% lower than the average test performance of candidates who sat the examination.

(5) If the candidate has achieved the minimum score in accordance with clause 4 and thus passed the test, the grade reads as follows:

- 1 = "very good" if he or she has reached at least 75%
- 2 = "good", if he or she has reached at least 50% but less than 75%
- 3 = "satisfactory" if he or she has reached at least 25% but less than 50%
- 4 = "sufficient" if he or she has reached no or less than 25%

beyond the minimum number of points to be achieved.

(6) If an exam is only partially carried out in the multiple-choice method, this part is evaluated in the multiple-choice procedure according to clauses 4 and 5. The remaining tasks will be judged according to the usual and appropriate methods. The grade of the examination will be determined from both partially grades, weighted by the proportions of each overall scores respectively.

(7) The grade of examination results evaluated by two examiners will be calculated from the arithmetic average of the two individual ratings. Clause 10 shall apply accordingly. However, the grade of the examination can only be "sufficient" or better or be "passed" when both examiners have at least the single grade of "sufficient" or "pass" fixed. In case a written test is judged by only one examiner with at least "sufficient" or "passed", the board of examiners, must determine a third examiner for the evaluation of the written test. Given the third examiner rates the work by "sufficient" or "passed", the grade of the written examination is formed from the arithmetic average of the two better grades, otherwise the note is "insufficient". If an oral examination of only one examiner rated at least "sufficient", the examination has to be repeated by two other examiners, appointed by the board of examiners, without imputation of a false test.

(8) If a module is completed by a module examination this grade constitutes the module grade at the same time.

(9) The overall grade of the master’s examination is generated by the arithmetic average of the non-rounded module grades and the grade of the master’s thesis, with the individual module grades and the grade of the master’s thesis being weighted with the respective number of credit points.

(10) The overall grade is at a mean:

with an average up to 1.5 = very good

with an average above 1.5 up to 2.5	= good
with an average above 2.5 up to 3.5	= satisfactory
with an average above 3.5 up to 4.0	= sufficient
with an average above 4.0	= insufficient.

When forming overall grades only the first decimal place behind the comma is considered; all other places are cancelled without rounding.

- (11) Instead of the overall grading of "very good" is the predicate "with distinction" granted if the thesis rated 1.0 and the arithmetic average weighted by the respective credit points module examinations is not worse than 1.2.
- (12) The overall grade shall also be indicated in the form of a grade corresponding to the European Credit Transfer System (ECTS). Moreover, ECTS grades may be issued for all graded examination performances. The board of examiners needs to decide on this matter. The ECTS grades are stated as follows:
- A = usually approx. 10% of the best successful students;
 - B = usually approx. 25% of the next successful students;
 - C = usually approx. 30% of the next successful students;
 - D = usually approx. 25% of the next successful students;
 - E = usually approx. 10% of the next successful students.
- (13) ECTS grades are principally formed on the basis of a comparison of the cohorts of the last six semesters. Should this group be smaller than 50 persons the reference group shall be determined by including the last ten semesters. In principle, the current semester shall not be considered when forming the ECTS grades. As long as no statistical data for the calculation of a relative assessment is available no ECTS grades shall be issued. For legal reasons the board of examiners may decide to refrain from issuing ECTS grades. Corresponding information shall be published in the final document. When composing the reference group distinctions must be made as to degree and degree course. Furthermore, the composition of the reference group may be altered in well-founded cases. The board of examiners needs to decide on this matter.

§ 22

Master's thesis

- (1) By writing the master's thesis, candidates or candidates can show their ability, to work on a distinct technical and scientific problem with scientific methods within a specified period. This includes the analysis of the relevant scientific preparatory work, the identification of appropriate solutions as well as the implementation of a solution and its evaluation. With the master's thesis 30 credit points can be acquired.
- (2) The master's thesis can be assigned and supervised by any professor, any assistant professor, and any habilitated lecturer qualified to teach at professorial level who works in research and teaching of the master's program Automation and Robotics. Other scientists complying with the requirements according to article 65, paragraph 1 Hochschulgesetz Nordrhein-Westfalen may be appointed as supervisor upon approval by the board of examiners.
- (3) In case a candidate cannot name a supervisor the chairman of the board of examiners provides for the candidate being assigned a topic for the master's thesis as well as a supervisor.
- (4) The master's thesis can be issued after the request of the candidate by the approval of the chairman of board of examiners. The timing of the issuing is to be recorded. The candidate can make suggestions for the topic of the thesis. The topic of the thesis must be assigned to the

candidate's major field of study, according to §7 clause 1. Is the major field of study by the choice of modules not yet clearly established prior to the issuing of the thesis, then the student has to specify in writing his or her major field of studies prior to the issuing of the thesis. The topic of the thesis can only be issued if the candidate has already acquired 80 credits. Within the 80 credits the candidate has already acquired all the credits of the first semester courses.

- (5) The topic of the master's thesis may only be returned once and within the first two weeks; in this case the master's thesis is considered as not commenced.
- (6) A completion period of six months is set for the master's thesis. Topic and scope must be so designed that the thesis can be completed within this period of time. Upon substantiated application of the candidate the chairman of the board of examiners may exceptionally grant an extension of up to four weeks in consultation with the supervisor. An application for extension must be filed two weeks before the completion period ends at the latest.
- (7) Benchmark for the length of the thesis is 60 pages, plus possibly an attachment. The master's thesis shall be issued in English language.
- (8) The master's thesis has to be the independent individual work. However, this does not mean that the topic of the thesis will not be processed within a workgroup. Here, it must be ensured that the gradable examination of the contribution of the individual work is clearly distinguishable and measurable and satisfies the requirements of paragraph 1.
- (9) The master's thesis includes the presentation of the work. The presentation takes place latest four weeks after the submission of the master thesis and lasts thirty minutes per candidate.
- (10) When submitting the master's thesis the candidate must affirm that he or she has written the thesis independently without having used any other sources and aids than those indicated in the text and that literal and analogous citations have been marked. Unpublished contributions have to be recorded in the source. A standard printed form issued by the Central Examination Office (Zentrale Prüfungsverwaltung) has to be used for the statutory declaration and contained with signature in the printed version of the master's thesis.

§ 23

Acceptance and evaluation of the master's thesis

- (1) The master's thesis is to be submitted to the board of examiners via the Deanery (Dekanat) of the Faculty of Electrical Engineering and Information Technology in triplicate and, in addition, electronically stipulated for a software product for plagiarism detection. The date of submission shall be recorded. When posting the documents the date of the postmark shall be valid. In case the master's thesis is not submitted at due date it shall be graded "insufficient" (5.0).
- (2) The master's thesis shall be reviewed and rated by two examiners. One examiner shall be the supervisor (first reviewer) of the thesis. The second examiner (second expert) shall be appointed by the chairman of the board of examiners. Individual assessment shall be made according to §17, clause 1 and must be substantiated in writing.
- (3) The grade of the master's thesis shall be generated by the arithmetic average of the individual grades provided that the difference does not exceed 2.0. In case the difference exceeds 2.0 or if the master's thesis is judged by only one examiner with at least "sufficient" (4.0) the board of examiners will appoint a third examiner to review and rate the thesis. In this case the grade shall be generated by the arithmetic average of the two best grades. §17, clause 10 applies accordingly. However, the thesis can only be graded "insufficient" (5.0) when at least two grades are "insufficient" (5.0).

- (4) The candidate shall be informed about the evaluation of the master's thesis eight weeks after submission at the latest.

§ 24

Additional qualifications

- (1) Before taking the final examination the candidate may take additional examinations in modules other than those required by the examination regulations. With these tests, no credits can be earned. It can also subjects of other courses of the Technical University of Dortmund be elected and tested.
- (2) Upon application by the candidate the results of examinations completed in these additional subjects are indicated in the diploma; however, they are not included when determining the overall grades.

§ 25

Diploma and diploma supplement

- (1) Directly, but not later than four weeks after the last examination has been rated the candidate receives a diploma certifying that he or she has successfully completed the master's examination. The diploma dates from the day of the last examination was taken. The diploma includes the overall grade of the master's examination as well as the ECTS grade according to §17, clause 12, the topic and grade of the master's thesis, modules and module grades as well as the number of credit points earned in each module.
- (2) The master's degree informs about the major field of studies.
- (3) Upon request of the candidate the diploma may comprise additional study and examination performances which have not been included in the module and overall grade.
- (4) A diploma supplement is added to the diploma. It describes type, content, and qualification level of the course of studies. Furthermore, the diploma supplement includes information on the university and the system of higher education respectively. The diploma supplement is issued in German and English language. An overview of the study and examination performances accomplished (Transcript of Records) is added to the diploma.
- (5) Upon request the candidate may be issued a certificate before the master's examination has been completed including examination performances accomplished so far (Notenbescheinigung); the certificate shall specify the successfully completed modules and credit points earned as well as examination performances and grades according to §17, clause 1 and the corresponding grades according to ECTS. This certificate may only be issued once per semester.
- (6) The diploma is signed by the chairman of the board of examiners.
- (7) The diploma and certificates shall also be issued in English language.

§ 26

Master's degree certificate

- (1) The candidate receives a master's degree certificate including the date of the diploma. It certifies the conferment of the master's degree according to article 4.

- (2) The master's degree certificate is signed by the dean of the Faculty of Electrical Engineering and Information Technology and the chairman of the board of examiners and provided with the faculty's seal.
- (3) The candidate receives one copy of the master's degree in German and in English.

II. Final provisions

§ 27

Invalidity of the examination and deprivation of the master's degree

- (1) If a candidate has cheated in an examination and if this fact does not become known until after the diploma has been delivered the board of examiners may subsequently amend the grades for those examinations the candidate has cheated in and may declare the examination as entirely or partially failed.
- (2) If the conditions for admission to an examination were not fulfilled without the candidate intending to cheat in this matter and if this fact does not become known until after the diploma has been delivered this deficiency may be resolved by passing the examination. If a candidate has deliberately obtained admission to an examination by unjust means the board of examiners shall decide on the legal consequences with respect to *Verwaltungsverfahrensgesetz Nordrhein-Westfalen* (Administrative Procedures Act for the Land North Rhine-Westphalia).
- (3) According to the clauses 1 and 2, before a decision is taken the candidate concerned shall be given the opportunity to comment on the incident.
- (4) A decision made according to clause 1 and clause 2 sentence 2 the incorrect diploma shall be revoked and, where appropriate, a new diploma shall be issued. A decision made according to clause 1 and clause 2 sentence 2 is excluded after a period of five years after having issued the diploma.
- (5) The master's degree is annulled and the master's degree certificate shall be revoked if it subsequently turns out that it has been obtained by deception or if basic requirements for its conferment have been assumed by mistake. The faculty board of the Faculty of Electrical Engineering and Information Technology decides on deprivation.

§ 28

Access to examination documents

- (1) After the result of an examination has been announced students are allowed inspection of their written test(s). Time and place of the inspection are determined by the examiners and shall be announced on the date of the examination at the latest.
- (2) Upon request students may also be allowed inspection of further written examination performances, related reports by the examiners, and the minutes of the examination. Application needs to be filed and addressed to the chairman of the board of examiners within three months after the examination results have been announced. The chairman of the board of examiners determines time and place of the inspection.

§ 29

Area of application, effective date and publication of the examination regulations

- (1) These regulations apply to all students who first enrolled in the winter semester 2012/2013 in the master's program Automation and Robotics at the University of Dortmund.
- (2) The §9 clause 3 sentences 4, 8, 9, 11, 12, the §17, clause 4 to 6, the §18, clauses 8 and 9, and the §19, clause 1 shall apply to all students in the master's program Automation and Robotics at the Technical University of Dortmund.
- (3) These examination regulations are published in the official gazette of Technische Universität Dortmund and shall come into effect on October 1, 2012.

Issued on the basis of the resolution adopted by the faculty board on May 22, 2013 and by the rector's board of the Technische Universität Dortmund on July 18, 2013.

Appendix: Structure of the master's program Automation and Robotics

	Module	Form of examination	Credit points
1 st semester	Advanced Engineering Mathematics Fachliche Grundlausbildung	Module examination	6
	Control Theory and Applications Mandatory Course	Module examination	6
	Computer Systems Mandatory Course	Module examination	6
	Modeling and Control of Robotic Manipulators Mandatory Course	Module examination	7
	Scientific Programming with Matlab in Engineering Course Lab	Module examination	3
	General Education I	Module examination*	
2 nd semester	Elective courses	including the elective courses of the 3 rd semester above 5 up to 9 module examinations (individual elected by the candidate)	30
	General education II	Module examination*	3
	Project group	Module examination*	12
3 rd semester	Elective courses	including the elective courses of the 3 rd semester above 5 up to 9 module examinations (individual elected by the candidate)	15
4 th semester	Master's thesis	Module examination	30

* simplified grading according to article 21, paragraph 2