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Study and Examination Regulations of the Otto-von-Guericke University Magdeburg for the Master's Programs Data and Knowledge Engineering, Digital Engineering and Visual Computing

Based on the Higher Education Act of the State of Saxony-Anhalt of 14.12.2010, the Otto-von-Guericke University Magdeburg has enacted the following statutes:

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I. General

§ 1
Scope of application

(1) The Master's program Computer Visualistics is renamed in the Master's program Visual Computing.

(2) These Study and Examination Regulations govern the objective, content and structure, together with the examinations and the certification of the Master's degrees in Data and Knowledge Engineering (MDKE), Digital Engineering (DigiEng) as well as Visual Computing (VisComp) at the Faculty of Computer Science at the Otto-von-Guericke University Magdeburg.

(3) These Master's degree courses are full-time, classroom-based study courses whose profile type is categorized as "more research-oriented".

(4) It is possible for students to undertake an individualized part-time course of study in accordance with the framework regulations for individualized part-time courses of study at the Otto-von-Guericke University Magdeburg.

§ 2
Program objective

The objective of the program is for students to acquire a broad but simultaneously detailed and critical understanding of the subject as well as the ability to work independently in accordance with scientific methods, to familiarize themselves independently with fields of activity relating to practice, research and teaching and to deal with the frequently changing array of tasks in the working life.

The Master's degree course supplements the content of the preceding Bachelor's degree course and, in terms of quality, considerably exceeds it. Students will acquire skills to enable them to critically examine opinions in their subject area, to solve problems as they arise in a scientifically structured way taking into account neighboring disciplines, and to represent their solution / communicate their knowledge to their peers as well as lay persons. They will be in a position to creatively develop their subject area beyond the current level and to acquire new knowledge. Graduates will be able to reach scientifically founded decisions, even on the basis of limited information, and to take societal and ethical insights into account in the process. They will be able to take on responsibility within a team.

Course-specific objectives will be outlined in the appendix.

§ 3
Academic title

Once the examinations required to graduate have been successfully completed, Otto von Guericke University shall award the academic title of

„Master of Science", or: **„M.Sc."** for short.

II. Scope and Progression of the Course of Study

§ 4
Admission to the course of study / admission requirements

(1)   The conditions for admission to the Master's degree course are as follows:

a)   The applicant provides evidence of a Bachelor's degree with at least 180 CP and a standard period of study of at least 6 semesters, a university diploma or a comparable degree from a state or state-recognized university of cooperative education, a Master's degree program or a related degree program completed with a state examination with good or very good results.

b)   For Data & Knowledge Engineering, the completed degree must be from computer science or a related discipline and must equate to:

   (aa)   at least one module on databases

   and
   (bb)   additionally

   1.   at least further 60 ECTS in Computer Science
   or
   2.   at least 40 ECTS in Computer Science and 20 ECTS in Applied Statistics.

   These ECTS / modules must not be acquired during internships, practical classes or exercises without related lectures.

c)   For Digital Engineering, the completed degree must be from Computer Science or from a field close to Computer Science or from an Engineering Science.

   Furthermore, the applicant must demonstrate basic knowledge in Computer Science through:

   (aa)   at least 20 ECTS in Computer Science (including projects in the core area of Digital Engineering)

   (bb)   or at least one year of relevant work experience with Computer Science-related tasks, whereas each year of work experience can compensate for 10 ECTS of missing Computer Science courses.

d)   For Visual Computing, the completed degree must be from computer science or a related discipline.

(2)   The Examination Board decides on admission from a subject-related field (see paragraph 1).

(3)   The candidate's specific suitability will be determined on the basis of the results of the degree examination in accordance with para. (1) a) and additionally using the eligibility assessment process and requires the previous course of studies to have been completed for DigiEng and VisComp with an overall grade of at least "good" (2.50) and for MDKE with at least a grade of 2.30.

(4)   Notwithstanding paragraph 2, specific suitability shall be assumed if the degree has not yet been completed at the time of submitting the application, but evidence is available of the candidate having already obtained at least 150 credit points (CP) on a six-semester Bachelor's degree course or 180 CP on a seven-semester Bachelor's degree course, and the average grade calculated from the examinations completed is at least 2.50 for DigiEng and VisComp and 2.30 for MDKE and additionally the eligibility assessment criteria are fulfilled.

(5)   The eligibility assessment is conducted in accordance with the "Ordnung zur Durchführung des hochschulinternen Auswahlverfahrens in den Masterstudiengängen Data and Knowledge Engineering und Digital Engineering" as well as the "Ordnung zur Durchführung des hochschulinternen Auswahlverfahrens in dem Masterstudiengang Visual Computing" (Regulations to conduct an eligibility assessment process for the Master study programs Data and Knowledge Engineering, Digital Engineering and Visual Computing).

(6)   Admission must be refused if the applicant has irrevocably failed examinations in the chosen course of study at a university or equivalent institute of higher education that falls within the area of application of the German Basic Law or is currently engaged in a corresponding examination procedure.

(7)

(a)   For Data and Knowledge Engineering and Digital Engineering, applicants must have adequate knowledge of the English or German language at the level of university entrance qualification. All applicants must provide an internationally accepted language certificate or an equivalent proof showing that their active and passive language skills correspond to Level C1 of the Common European Reference Framework for Language.

(b)   For Visual Computing, sufficient knowledge of the English language must be proven by an internationally accepted language certificate that corresponds to active and passive language skills on the Level C1 of the Common European Reference Framework for Language.

(8)   The decision regarding whether or not the admission requirements are satisfied shall be made by the Board of Examiners.

(9)   The certificates and proofs must be submitted in German or English or must be translated by a sworn translator.

§ 5
Commencement and duration of studies

(1) For Data & Knowledge Engineering and Digital Engineering, enrolment is possible in the summer and winter semester.

For Visual Computing, enrolment is possible in the winter semester.

(2) The standard course duration, including the preparation of the Master's thesis is 4 semesters.

(3) The Master's degree courses are designed in such a way that the courses, including the preparation of the Master's thesis and colloquium, can be completed in a standard duration of 4 semesters.

§ 6
Organization and scope of studies

(1) The required study effort is indicated by the number of credit points (CP) according to the European Credit Transfer System (ECTS). Altogether this amounts to 120 CP, which are divided into mandatory modules and the Master's thesis. The completion of additional free elective modules is also possible. For the successful completion of the Master's degree course, a total of at least 300 CP must be obtained, inclusive of the undergraduate course of studies.

(2) The credit points specified describe the study effort, which is comprised of the participation in classes, the preparation for and reviewing of classes, independently processing and consolidating the subject matter and demonstrating study achievements. One credit point corresponds to an effort of approx. 30 working hours. The workload is approx. 30 CP per semester.

(3) Usually, the degree course is divided into three phases:
   - one semester, which imparts necessary basic knowledge for the course of study,
   - two semesters to reach the required credit points from the offered courses,
   - one semester for writing the Master's thesis.

See appended study and examination schedules.

(4) The content of the course can be found in the module handbook.

(5) Students can complete the Master program Digital Engineering at the Faculty of Computer Science in the form of a double degree program. Deviations from the regulations in this document are regulated in Appendix 3 "Verlaufsvariante eines Doppelabschlussprogrammes".

(6) At the end of the second semester, students must have obtained at least 16 CP.
After this deadline, the Board of Examiners in cooperation with the student will define courses from the study plan of the first and second semester of at least 16 CP, which the student has to complete by the end of the third semester.
If the student does not attempt the exam for the defined modules, these will be considered as failed once. This does not apply, if the student can prove that exceeding the

deadline was not his fault. The Board of Examiners is responsible for exception decisions.

§ 7
Course structure

(1) The teaching program includes mandatory and mandatory elective modules.

(2) "Mandatory modules" applies to all modules that are required for successful completion of the course of studies in accordance with the Examination and Study Regulations. The amount of work for the mandatory modules is stated in the study and examination schedules in the appendix.

(3) Mandatory elective modules are all modules that are offered in the mandatory courses as well as in the field of key and method skills of the individual Master programs and which are mandatory for the successful completion of the course of studies.

(4) Within the context of the chosen discipline, the mandatory elective modules enable students to pursue individual inclinations and interests and to take the subject-specific requirements of their future field of professional activity into account. The list of mandatory elective modules may be amended in accordance with developments in the disciplines taught and the availability of teaching staff and be adapted to the teaching program of the department.

Upon application by the student to the Board of Examiners for the course in the Faculty of Computer Science at Otto von Guericke University Magdeburg, in agreement with the course leader/subject advisor, further modules from every faculty at Otto von Guericke University Magdeburg may be recognized as mandatory elective subjects.

(5) The modules are completed with module assessments consisting of one or more examinations. Examinations must be completed during the course of studies either during or at the end of the respective module. For each successfully completed module, a certain number of credits will be awarded in accordance with the European Credit Transfer System (ECTS).

(6) All modules that students complete at their own option in addition to the mandatory and mandatory elective modules from modules offered by the Otto-von-Guericke University Magdeburg are described as free elective modules. Students are free to take examinations in the elective modules. The results of such examinations will not be taken into consideration when determining their final degree classification. However, they will be shown in the transcript on request.

(7) The degree course concludes with a final thesis, known as the Master's thesis, and its presentation in a colloquium. Together, the Master's thesis and colloquium equate to 30 CP. The maximum time that may be taken to complete the thesis is 22 weeks.

(8) The dates mentioned in the appendix for the completion of modules and examinations should be seen as a recommendation for the completion of the degree course within the standard course duration. Further information on the course can be obtained from the

examination office of the Faculty of Computer Science, from the subject's student advisory service and from the enrolment office of the Otto-von-Guericke University Magdeburg.

(9) The assignment of modules to topic areas and general regulations regarding this are regulated in module lists. The board of examiners once per semester or as necessary can update these module lists. Changes in module assignments have to be announced to the students timely and in an appropriate place.

§ 8
Types of teaching units

(1) Teaching is delivered in the form of lectures, seminars, tutorials, excursions, projects and colloquia (also in combination).

(2) The purpose of lectures is to present and communicate cohesive scientific, functional, technical and creative basic and specialist knowledge as well as methodological skills.

(3) The purpose of seminars is to consolidate the knowledge conveyed in the lectures and to acquire methodological skills in combination with application-oriented practice. This can be realized in changing forms of work (presentation of information, oral presentations, position papers, discussions) and in groups.

(4) Tutorials mainly serve for the deepening of knowledge gained during the lectures and the acquisition of methodical skills combined with application-oriented exercises.

(5) Excursions serve for the demonstration and collection of information and for the practical experience on site.

(6) Projects are used to work on complex tasks taking theoretical principles into particular account on the basis of practical examples. The results are presented in a final project assignment and a colloquium – a method of presentation that is also customary in professional practice. The project may be supervised by an interdisciplinary team of lecturers, members of which may act as both coach and mentor. The students may come from different courses and semesters. Access to projects may depend on the students having fulfilled certain requirements, as well as on the module regulations. It is also possible for students, in agreement with a course lecturer, to work on a project independently during a semester.

(7) The main focus of the colloquium is to present and defend the knowledge acquired during the project. The objective of the colloquium is to reflect on a subject in theoretical and practical terms to a high professional standard.

§ 9
Departmental academic counseling

(1) In order to facilitate orientation at the Otto-von-Guericke University for new students, introductory courses are held at the start of each program.

(2) These Examination and Study Regulations only contain information of a general nature; for this reason, further information is needed for precise orientation and planning of the course of studies. To this end, students are also recommended to familiarize themselves with the module handbook.

(3) Academic counseling is offered by the faculty for each course. The relevant persons are listed on the faculty website and in the examination office.

(4) Academic counseling can be called upon at any time and is especially useful in the following cases:

- Initial difficulties upon commencement of studies,
- Choice of areas of concentration / elective subjects,
- Failure to comply with the standard course duration to a significant extent
- Significant shortfall of credit points required per semester,
- failed examinations,
- change of course or university,
- studies abroad and individual study plan organization.

§ 10
Individualized study plans

(1) The aim of individualized study plans is to facilitate the successful completion of the course within the standard course duration. They are offered particularly to those students who are dealing with especially heavy demands as a result of long-term illness, the birth of or care for their own children, or similar.

(2) The student advisor is the point of contact for students who wish to draw up an individualized study plan.

III. Examinations

§ 11
Board of examiners

(1) A Board of Examiners is established to ensure that the duties and responsibilities detailed in these Examination and Study Regulations are satisfied. It consists of 7 members, who are elected by the Faculty Council. The chairperson, deputy chairperson and two further members are elected from among the professors, two members from the academic staff and one member from the student body.

(2) At the beginning of each semester the Board of Examiners determines the period for examinations.

(3) The Board of Examiners ensures proper implementation of the examinations. Further, the board enforces compliance with the terms set out in these Examination Regulations. It makes suggestions regarding the reform of these Examination and Study Regulations. Special emphasis is placed on compliance with the standard course duration and with examination deadlines.

(4) The Board of Examiners makes its decisions based on a majority vote. In the case of an even split, the chairperson or, when absent, his or her deputy, shall have the casting vote. The Board of Examiners is quorate when the majority of its members, including at least two members from among the professors, are present.

(5) The term of office of the members of the Board of Examiners is two years, with student incumbency limited to one year. Members may be re-elected.

(6) In individual cases, the Board of Examiners may delegate strictly defined and revocable power of authority to the chairperson or his or her deputy. The chairperson prepares and executes the resolutions of the board, and regularly informs board members as to his or her activities.

(7) The members of the Board of Examiners have the right to participate as observers during the examinations.

(8) The members of the Board of Examiners are obliged to maintain confidentiality. If they are not government employees, members must make a pledge of secrecy to the chairperson.

(9) To support the work of the Board of Examiners, there is an examination office in the faculty.

§ 12
Examiners and assessors

(1) The Board of Examiners appoints the examiners and assessors. Professors, junior professors, university lecturers, associate professors, academic staff, if they have a teaching role, teaching staff and persons with experience in professional practice and training are authorized to conduct examinations. Examinations may only be assessed by persons who themselves possess at least a Master's degree or equivalent qualification.

(2) For the evaluation of written examination scripts, at least two examiners must be appointed. If the Board of Examiners determines that, having considered all those authorized to be examiners or assessors pursuant to paragraph 1, the additional burdens arising from appointment as an examiner for a particular examination date would have an unreasonable impact on their other duties, or if two examiners are not available, it can thereupon resolve that the written examinations may be graded by one examiner only. The resolution must be communicated to the students when registering for the examination.

(3) Two examiners must be appointed to evaluate the Master's thesis, of which one must be a university lecturer.

(4) Students may propose examiners for oral examinations and the Master's thesis. This proposal shall not, however, be legally binding.

(5) The examiners are independent in their duties.

(6) The Board of Examiners is to ensure that students are informed in due time as to the names of the examiners.

(7) For the examiners and assessors, §11 para. 8 applies accordingly.

§ 13
Recognition of periods of study, academic achievements and examination results

(1) Upon written application, the Board of Examiners will decide on the recognition of prior periods of study, academic achievements and examination results. The application is to be addressed to the Board of Examiners of the respective course of study within eight weeks after start of the course. Upon termination of the application period, the recognition of these achievements is excluded. For purposes of recognition, students must present the necessary original documents or certified copies thereof.

(2) Periods of study, academic achievements and examination results from courses at universities within the scope of application of the German Basic Law shall be credited, provided that no significant difference can be ascertained. Periods of study, academic achievements and examination results obtained abroad shall be credited, provided that there is no significant difference. When crediting periods of study, academic achievements and examination results obtained outside the Federal Republic of Germany, the Lisbon Convention of 11 November 1997, the equivalence agreements approved by the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder and the Rectors' Conference of the Universities of Applied Sciences, together with the regulations set out within the context of university cooperation agreements, must be taken into account.

As long as it is already being applied by both parties, the basis of evaluation is the European Credit Transfer System (ECTS).

(3) Where grading systems are comparable, the grades will be adopted and used in calculating the cumulative grade.

(4) At most 50 percent of the knowledge and skills acquired outside higher education can be accredited to the university education, as far as they are pertinent and if content and level of the modules are equivalent to the course of study. The application is to be addressed to the Board of Examiners within eight weeks after start of the course. For purposes of recognition, students must present the necessary original documents or certified copies thereof. The recognition of Master's theses and internship modules is not possible. Upon termination of the application period, the recognition of skills and expertise acquired outside of the university is excluded.

§ 14
Types of course-related examinations

(1) The type of examination can be found in the respective module description in the module handbook of the respective course of study one week before the start of the semester at the website of the faculty.

(2) The following types of examinations may be held during the program:

  – Written examination or electronic examination (para. 3),

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- Oral examination (para. 4),

- Academic project (para. 5),

- Term / academic paper (para. 6),

- Oral presentation (para. 7)

(3) In a **written examination** that is invigilated and taken in a time-limited session with limited aids, students are required to demonstrate their comprehension of standard methodology and problem recognition and solving skills within their specific fields. A written examination shall last for a minimum of 120 and not longer than 240 minutes.

(4) In an **oral examination**, students should be able to demonstrate their capacity to recognize and classify complex issues from the specific topic under examination. As part of the oral examination, a reasonable number of written exercises may be set, provided that the oral character of the examination as a whole is not affected.

The oral examination shall take place with several examiners (panel examination) or with one examiner and an expert assessor in the form of an individual or group examination, whereby up to 3 students may constitute a group. The assessor is to be consulted before a final grade is given. As a rule, the duration of the examination for each student should amount to 30 minutes. The essential points of the examination and its evaluation must be recorded in writing. This record must be signed by the examiners and the assessors. The results are to be announced to the student directly following the presentation of the oral examination.

(5) By working on a **joint academic project**, students demonstrate their capacity to produce scientific work independently as well as to work in a team. Individual contributions to a project must be clearly discernible.

(6) A **term / academic paper** requires an experimental, empirical or theoretical approach to a specific subject from within the field of study. The nature of the task must allow it to be completed within the lecture period of the current semester. Students are free to propose topics and task definitions for their papers. However, their proposals shall not be legally binding. If required, the academic paper may be presented orally in a manner suitable to the vocational field in question. If students are more overburdened than normal with other examination work, the completion time may be extended only once by up to one half. In doing so, due consideration must be given to compliance with the standard course duration.

(7) An **oral presentation** encompasses:

- an independent and thorough written examination of a problem from within the context of the course of studies which takes into account and evaluates relevant literature, and

- a presentation of the work and communication of the results in an oral report and in the ensuing discussion. Written workings must be available.

(8) Assessment prerequisites (proofs of performance) may need to be satisfied as a condition of admission to a module examination. Failed examinations can be repeated arbitrarily. The conditions for satisfying assessment prerequisites and their type and scope

must be announced by the lecturers at the start of the course (no later than three weeks after start of the course). It is stated in the module descriptions if performance records are required.

(9) Group projects are also a permissible form of examination. The contribution of each individual student must meet the examination requirements and be clearly discernible and assessable on the basis of sections, pages or other objective criteria. A group must not contain more than six students.

(10) The type and scope of the examinations for the individual modules can be found in the module handbook. The types of examination covered by these regulations (written or oral examination) may be amended under the following conditions:

(a) If 12 or fewer candidates are registered or can be expected for an examination that is designated as a written examination, then upon application by the examiner, the Board of Examiners may agree to the examination being conducted orally instead. This approval shall only apply for one examination date. In case of re-examinations it is only granted if the first examination was also orally.

(b) If 20 or more candidates are registered or can be expected for an examination that is designated as an oral examination, then upon application by the examiner, the Board of Examiners may agree to the examination being conducted in writing instead (duration: at least 120 minutes). This approval shall only apply for one examination date. In case of re-examinations it is only granted if the first examination was also in written form.

Students affected by a change to the form of examination must be notified without delay (by notice of the examination schedule).

Oral examinations of 30 minutes length must be replaced by written examinations of 120 minutes length; longer oral examinations (up to 60 minutes) must be replaced by written examinations of at most 240 minutes length. Inversely, written examinations of 120 minutes length must be replaced by 30 minutes long oral examinations and written examinations of 240 minutes must be replaced by oral examinations of at most 60 minutes.

(11) The examiner will decide which examination aids may be used in a written examination. Grades must generally be announced no later than 6 weeks after the examination.

(12) The regulations of the relevant faculties apply for module examinations in other faculties.

(13) Examinations can be conducted in German or English language.

§ 15
Protective provisions, compensation for disadvantages

(1) Where a student provides credible evidence (medical certificate) that, due to a prolonged or permanent illness, he or she is completely or partially unable to fulfil the examination requirements in the prescribed form, the Board of Examiners must provide the student with the possibility of taking equivalent examinations in a different form.

(2)   Disabled students may be granted additional materials or aids to compensate for disadvantages, provided that this is necessary to establish equality of opportunity. To this end, the duration of the assessment may be extended to a reasonable degree or approval may be given for the examination to be taken in a different form. A disabled student is defined as someone who, due to a protracted or permanent physical impediment, is not in a position to complete the examination in the prescribed form, either in whole or in part. The impediment must be substantiated. The University may require substantiation in the form of a medical certificate or submission of the student's certificate of disability. Compensation for disadvantages must be applied for in writing to the Board of Examiners. The application should be made no later than when registering for the examination.

(3)   The protective provisions pursuant to the Maternity Protection Act and, in accordance with the time limits set out by the Federal Child-Raising Allowance Act as to parental leave, are to be strictly adhered to and promoted in applying these Study and Examination Regulations, especially in terms of the calculation of time limits. During a leave of absence granted on the grounds of family responsibilities, students are free to continue with their studies and examinations. Upon written application to the Board of Examiners, the repetition of a failed examination during the leave of absence is admissible.

§ 16
Public access to oral examinations

As long as they are not registered to take the same examination, students of this programme who have yet to successfully complete the respective examination may be present at the oral examinations as observers. This, however, does not include the counselling and notification of the students being examined regarding their examination results. Pursuant to sentence 1, a student may apply to exclude observers from his or her examination.

§ 17
Admission to participate in examinations during the program

(1)   Anyone who is enrolled at Otto von Guericke University on the course specified in §1 may be admitted to the examinations during the course.

(2)   Students of this program must apply for admission to the examinations and repeat examinations within the period of time specified by the Board of Examiners and in the form defined. Failure to comply with the registration deadline shall result in admission to the examination being refused, unless the Board of Examiners decides otherwise upon written application by the student.

(3)   Suggested examiners and, where the corresponding documentation is not already in the possession of Otto von Guericke University, evidence of completed assessment prerequisites must be appended to the application for admission.

(4)   The application may be withdrawn no more than one week prior to the respective examination date. In the event of a withdrawal, a new application for admission to the examination must be submitted in accordance with paragraphs 1 and 2 for a later examination date.

(5)   The Board of Examiners is responsible for admission decisions. Admission must be refused if:

      1. the requirements for admission are not fulfilled or

      2. the documents are incomplete or

      3. the module examination has been irrevocably failed or is deemed to have been irrevocably failed.

§ 18
Assessment of examination results and determination of module grades

(1)   Each examination is evaluated and graded by the respective examiners. For written examinations, grades should be announced no later than six weeks after the examination has been taken. The Board of Examiners can determine deadlines for the assessment of written examinations.

(2)   The following grades are to be used for the assessment of examinations:

Grade		
1	very good	an outstanding performance
2	good	a performance which is significantly above average
3	satisfactory	an average performance
4	sufficient	a performance which, in spite of its shortcomings, is considered to be sufficient
5	insufficient	a performance which, because of substantial shortcomings, does not meet the requirements

For the sake of greater differentiation, individual grades may be rounded up or down by 0.3; this does not apply to the following grades: 0.7, 4.3, 4.7 and 5.3.

(3)   An examination is considered to have been passed if a minimum grade of "sufficient" is awarded.

If an examination is graded by more than one examiner, it is considered to have been passed if all examiners award at least a grade of "sufficient".

In this case, notwithstanding the regulation stipulated in paragraph 2, the grade awarded for the examination corresponds to the arithmetic average to one decimal place of the individual grades determined by the examiners.

(4)   A module examination is considered to have been passed when the necessary examination has been awarded a grade of at least "sufficient".

If a module examination comprises only one exam, the module grade equates to the grade of the examination. If a module examination comprises several exams, notwithstanding the regulation stipulated in paragraph 2, the grade awarded for the module shall correspond to the arithmetic average to one decimal place (and if necessary weighted) of all grades awarded for the examinations in the module.

(5)   A multiple choice examination is deemed to have been passed if the examination candidate obtains at least 50 percent of the possible points score (absolute pass mark) or if the points score achieved by the candidate does not fall short of the average score of all candidates on the specific examination date by more than 22 percent (sliding scale pass mark). The sliding scale pass mark shall only apply if the examination candidate has achieved at least 40 percent of the possible points score. The difference between the relative and absolute pass mark shall be added for each examination candidate in order to determine the individual examination results. This paragraph shall only be applied if the proportion of examination questions in the multiple choice examination exceeds 50 percent.

(6)   When arriving at a grade by means of averaging, only the first decimal place will be taken into account; all other decimal places will be disregarded. Grading structure:

For a grade average of	Grade
up to and including 1.5	very good
from 1.6 up to and including 2.5	good
from 2.6 up to and including 3.5	satisfactory
from 3.6 up to and including 4.0	sufficient
from 4.1	insufficient

§ 19
Repetition of examinations

(1)   Examinations that are failed or deemed to have been failed may be repeated. Repeat examinations must be taken no sooner than six weeks and by no later than 15 months after the failure of the examination, unless an extension is granted to the student for specific reasons that are beyond his or her control. The student must reregister for the examination. § 18 applies accordingly for the assessment. Should the student interrupt his or her course of studies, or in the case of other justified reasons, binding stipulations must be made by the Board of Examiners regarding the completion of repeat examinations. § 18 applies if the deadline for repetition of the examination should be missed.

(2)   For written exams, the Board of Examiners determines the re-examination date and announces it in the student information system (currently: HIS-LSF).

(3)   For all types of examinations, students are obliged to observe the time limits themselves. In case of failure to observe the time limit by the students, the respective examination is deemed as uniquely failed.

(4)   Examinations can at most be repeated two times. A second repetition of an examination is only permitted for at most three examinations during the whole course of studies. If the first re-examination was an oral or a written examination, the second re-examination will be oral. If the first examination or the re-examination were in written form, the length of the oral examination is based upon the conversion formulas in §14 para. 10.

For the time limits para. 1 applies accordingly.

(5)   Unsuccessful attempts to take an examination in the chosen course of study at a higher education institution within the area of application of the German Basic Law shall be counted towards the possibilities of repeating the examination.

(6)   An examination that has been passed may not be repeated.

§ 20
Supplementary examinations

(1)   Students may also take examinations in additional modules to those modules in the mandatory and mandatory elective parts of the course that are prescribed in the attached examination schedule.

(2)   Upon request of the student, the results of supplementary examinations will be included in the academic transcript and / or certificates. The results of supplementary examinations are not taken into consideration when calculating grade point averages and when determining the cumulative grade.

§ 21
Stepping back from an exam

Once in the whole course of his/her Master program a student can step back from an exam, which has been started but not yet completed, if the course is not a mandatory subject according to the study and examination schedule. The request for registration for the exam will then be considered void.

IV. Master's Thesis

§ 22
Master's thesis registration

(1)   Only students who are enrolled at Otto von Guericke University in the course specified in § 1, who can demonstrate that they have obtained at least 90 credit points, shall be permitted to register for their Master's thesis.

(2)   Students are to make a written application to the Board of Examiners for admission to write their Master's thesis. A proposal for the subject area with which the Master's thesis is to deal, and if necessary an application for the issuing of the subject as a group thesis, and, if necessary, suggested examiners, must be appended to the Master's thesis registration application.

§ 23
Issuing of the topic, submission and assessment of the Master's thesis

(1)   The Master's thesis should demonstrate that students are capable of working independently and in a scientific manner within a given time frame on a particular problem. The topic and task definition of the Master's thesis must correspond to the purpose of the examination and the required period.

(2) The Master's thesis topic must be issued in due time such that the Master's examination can be completed within the standard period of study. Generally, the topic is issued at the beginning of the fourth semester. Upon application and if all requirements are fulfilled, the chair of the Board of Examiners ensures that the student receives a topic for his or her Master's thesis within a reasonable timeframe.

(3) Students should be given the opportunity to make proposals for the Master's thesis topic and task definition. Wherever possible, the student's proposal should be accepted. However, it shall not be legally binding. The topic is determined by the examiner after hearing of the examinees. Task-specific criteria for the assessment are revealed before the start of the Master's thesis. All partial performances are incorporated into the grading. The issuing of the subject must be recorded.

(4) The Master's thesis is issued and supervised by a person who is authorised to be an examiner in accordance with § 12 para. 1. This person must be a member of the faculty to which the course belongs. The task definition must be confirmed by a university lecturer. If several faculties are involved in a course, this person must belong to one of these faculties. In justified exceptional cases, the topic may, however, with the approval of the Board of Examiners, be issued by a person who is authorised to be an examiner who does not fulfil this condition. In this case, the second examiner must be a member of the faculty.

(5) The maximum time between the issuing of the topic and the submission of the Master's thesis is 22 weeks.

If the student is prevented from complying with this deadline for reasons beyond his or her control, the time for completing the thesis may be extended by at most two months upon written application to the board of examiners. An aborted attempt to write the thesis shall not be counted among the number of possible repetitions if the attempt is evidently not caused by the student.

A justified application to extend the submission deadline by a maximum of two months must be submitted in due time by the student to the Board of Examiners following consultation with his or her supervisor.

With issuing of the topic, the examiners are summoned. According to §12 para. 1, the examiners must be authorized. At least one examiner must belong to the group of university lecturers.

(6) The topic may only be returned once and only within the first third of the completion time. This is to be recorded at the examination office of the faculty. In case of withdrawal, the application for approval is to be made again at a later date.

(7) The Master's thesis may be completed in the form of a group thesis. The contribution of each individual student must be clearly discernible and assessable on the basis of sections, page numbers or other objective criteria, and meet the examination requirements as per paragraph 1. The group size is limited to 3 students.

(8) The Master's thesis must be written in German or English.

(9)   Upon submission of his or her Master's thesis, a student must guarantee in writing that his or her thesis – or identified section in the case of a group thesis – has been written individually and that no sources or tools have been used other than those cited in the bibliography.

(10)   The Master's thesis must be submitted by the deadline in two written, bounded copies as well as in a suitable digital form (PDF format) for plagiarism assessment to the examination office; the date of submission must be recorded. If the Master's thesis is not submitted within the time limit, it shall be graded as "insufficient".

(11)   Examiners must review and grade the Master's thesis within four weeks from the submission date.

The Master's thesis shall be deemed to have been failed if all grades are "insufficient (5.0)". If one examiner grades the thesis as "insufficient (5.0)", a third examiner is summoned. Then, if two of the assessments are graded "insufficient (5.0)", the Master's thesis is deemed as failed.

If only one of the three assessments is graded "insufficient (5.0)", the Master's thesis is deemed as passed. In this case, the grade is calculated from the arithmetic average of the assessments. Notwithstanding, the thesis is graded with 4.0 if the arithmetic average is larger than 4.0.

The overall grade results from the assessment calculated by the arithmetic average with factor 2/3 and the assessment of the Master's colloquium with factor 1/3.

(12)   The Master's thesis is to be made publicly available. A publication of scientific results in relevant literature must not be unreasonably excluded by contract. In this case, the Master's thesis will not be accepted for assessment by the Faculty of Computer Science. However, restriction notes with retention periods of at most 2 years are permitted.

§ 24
Colloquium

(1)   The colloquium for the Master's thesis is the student's opportunity to demonstrate that he or she is capable of defending the results of his or her scientific work in an academic debate within the chosen field of studies.

(2)   For the student to be admitted to the colloquium the Master's thesis must have been graded at least "sufficient" and all examinations and achievements of at least 90 CP must be present.

(3)   The colloquium on the Master's thesis will be held as an individual or group examination by the Master's thesis examiners. The Board of Examiners may appoint additional examiners. The topic of the Master's thesis and the associated problems and findings must be described in a maximum 25 minute-long oral presentation, after which questions regarding the presentation must be answered. In case of a group examination, the time shall be reduced to a maximum of 15 minutes per student. As a rule, the total duration of the examination for each student should be 60 minutes and not more than 75 minutes.

(4)   The colloquium is successfully completed if the examiners award a minimum grade of "sufficient".

(5)   The colloquium on the Master's thesis is open to all students, employees and visitors of the university. Generally, the colloquium is to be held at the Otto-von-Guericke University Magdeburg or at associated institutions of the Otto-von-Guericke University. A deviation is possible upon justified request to the Board of Examiners. It must be stated why a colloquium at the Otto-von-Guericke University is not possible and how the publicness is guaranteed in this case. The application must be made in due time to enable to be discussed by the Board of Examiners before the defense date.

(6)   30 CP are awarded for the successfully defended Master's thesis and colloquium.

(7)   The cumulative grade for the Master's thesis including the colloquium results from the arithmetic average of the grade of the first examiner, grade of the second examiner and the grade for the colloquium. §18 applies for the assessment.

§ 25
Repetition of the Master's thesis and the colloquium

(1)   A Master's thesis may be repeated once with a new topic if it has or is deemed to have been graded as "insufficient".

(2)   If a Master's thesis is repeated, returning a topic is only permissible if no use was made of this possibility the first time.

(3)   The new topic of the Master's thesis will be issued in a timely manner, generally within three months.

(4)   A second repetition is not permitted.

(5)   Repetition of a successfully completed Master's thesis is not permitted.

(6)   The colloquium for a Master's thesis may be repeated once if it has or is deemed to have been graded as "insufficient". The repetition must take place within 8 weeks.

(7)   A second repetition of the Master's thesis colloquium is not permitted.

(8)   Repetition of a successfully completed Master's thesis colloquium is not permitted.

§ 26
Overall result of the Master's degree

(1)   The Master's examination shall be deemed to have been passed if all mandatory and mandatory elective module examinations required in accordance with the study schedule and the Master's thesis and colloquium have been awarded a minimum grade of "sufficient".

(2)   The cumulative grade of the Master's examination is calculated from the weighted average of the grades for the module examinations and the module grade of the Master's thesis with the colloquium. § 18 para. 5 applies accordingly.

(3) If the average of the cumulative grade is better than 1.2, then the classification "passed with distinction" shall be awarded.

(4) A Master's examination shall be deemed to have been irrevocably failed when a course examination or Master's thesis and colloquium have received a grade of "insufficient" or are deemed to have been graded "insufficient" and no further repetitions are permitted.

§ 27
Academic transcripts and certificates

(1) Academic transcripts are to be issued without delay, if possible within four weeks of the Master's examination having been passed. The transcript bears the date on which the last examination was completed. It must be signed by the chair of the Board of Examiners and stamped with the Otto-von-Guericke University stamp.

(2) The transcript will include the module grades, the grade for the Master's thesis and the cumulative grade and ECTS grade. Furthermore, the transcript will indicate the topic of the Master's thesis.

(3) Together with their transcripts, students receive a Diploma Supplement.

(4) If the Master's degree is not awarded or is deemed to have been failed, the Board of Examiners will issue the student with written notification of this fact, including information regarding whether and to what extent examinations may be repeated. The notification about an irrevocably failed Master's examination is to be provided with information on legal remedies.

(5) If students choose to leave the University or change their program of studies, upon application they will be issued with a certificate showing the examinations taken and grades achieved. This will indicate the examinations remaining to be completed as well as whether or not the Master's examination has been failed or irrevocably failed. In case of para. 4, the certificate is also issued without request.

§ 28
Degree certificate

(1) With the transcript, students also receive a degree certificate bearing the same date as the transcript. This also includes the certification of the award of the title of Master.

(2) The degree certificate is signed by the Dean and the Chair of the Board of Examiners of the Faculty of Computer Science of Otto-von-Guericke University, and is also provided with the Otto-von-Guericke University stamp.

V. Final Provisions

§ 29
Accessing the examination files

Up to one year after completion of their degree, upon written application students are entitled to view their study and examination records. The application must be submitted to the Board of Examiners at the Faculty of Computer Science. The chairperson of the Board of Examiners will determine the time and place for reviewing the documents.

§ 30
Non-attendance, withdrawal, cheating, breach of regulations

(1) An examination will be deemed to have been graded "insufficient" when students, for no good reason:

- do not attend a mandatory examination date,

- withdraw from the examination after it has already begun,

- do not adhere to the deadline,

- or do not retake an examination within the established time frame.

(2) The justifications provided for any withdrawal or non-attendance must be credible and immediately presented to the Board of Examiners. Otherwise, the examination will be graded as "insufficient". In case of illness, a medical report must be presented. Unless the Board of Examiners resolves otherwise, upon recognition of the reasons for non-attendance or withdrawal, the examination must be taken on the next regular examination date.

(3) An examination will be graded "insufficient" if a student attempts to alter the results through deceit or the use of other unauthorized means. Examiners and supervisors are authorized to exclude from further participation any student who disrupts the orderly conduct of the examination. If this is the case, the examination will be graded as "insufficient". In extreme cases, the Board of Examiners is authorized to exclude the student from any further examinations.

§ 31
Invalidity of examination results

(1) If a student has cheated in an examination and this becomes known after the degree has been awarded, the Board of Examiners is authorized to declare an examination to have been failed either partially or in its entirety.

(2) If the requirements for admission to an examination were not fulfilled without intentional deception, and if the fact only becomes known after the certificate has been issued, this defect is cured by passing the examination. If a student has intentionally obtained admission unlawfully, the examination board shall decide on the withdrawal of unlawful administrative acts in compliance with the statutory provisions.

(3)   Prior to such a decision, the affected student is to be given the opportunity to make a statement on the matter to the Board of Examiners.

(4)   The incorrect transcript must be recovered, and if necessary replaced with a new transcript or certificate in accordance with § 26 para. 5. The Master's degree certificate must be recovered, if the Master's examination is declared to have been failed as a result of the act of deception. No decision may be made in accordance with paragraphs 1 and 2 after a period of five years from the date of the transcript being issued has elapsed.

§ 32
Decisions, appeal procedure

(1)   All decisions made in accordance with these Examination Regulations, and which constitute an administrative deed, are to be justified in writing and provided with instructions on appeal in compliance with Art. 41 of the Administrative Procedures Act of Saxony-Anhalt (VwVfG LSA). An appeal against this decision may be submitted within one month of notification. The appeal must be submitted in writing or by recorded declaration to the Board of Examiners of the Faculty of Computer Science.

(2)   The Board of Examiners will decide as to the validity of the appeal. If the appeal involves a grade, the appeal will be sent to the examiner or examiners for their review. The Board of Examiners will declare the objection to have been remedied if the grade is changed in accordance with the appeal. Otherwise, the Board of Examiners shall only review the decision in terms of

   1.   whether or not the examination procedures were properly conducted,

   2.   whether or not the examiner relied on unfounded facts or circumstances,

   3.   whether or not generally valid principles of grading were applied,

   4.   whether or not the examiner was influenced by immaterial considerations.

§ 33
Withdrawal/revocation of the academic title

Withdrawal or revocation of the Master's degree is in accordance with § 20 of the Universities Act of Saxony-Anhalt.

§ 34
University-wide announcements by the Board of Examiners

Decisions and other measures relating to these Examination Regulations, especially with regard to admission to examinations, refusal of admission, registration and examination dates and deadlines as well as examination results, will be made known University-wide in the institution's customary manner. In doing so, data protection regulations will be observed.

§ 35
Transitional Regulation

These regulations shall apply to all students who enroll in the Master's degree courses Data and Knowledge Engineering, Digital Engineering or Visual Computing from the winter semester 2021/2022.

Students who were already enrolled in the courses Data and Knowledge Engineering or Digital Engineering before 01.10.2021 may apply to accede to these regulations. The application must be submitted in writing to the Board of Examiners of the Faculty of Computer Science. It may not be revoked.

§ 36
Effective date of regulations

These Study and Examination regulations shall enter into force on the day after they are published in the official announcements of the Otto-von-Guericke University.

Issued by virtue of the resolutions of the Faculty Council of the Faculty of Computer Science dated 08.04.2021 and the Senate of the Otto-von-Guericke-Universität dated 21.04.2021.

Magdeburg, 23.04.2021

Prof. Dr.-Ing. habil. Jens Strackeljahn

President

of the Otto-von-Guericke University Magdeburg

Appendices:

1.) Study and examination schedules
2.) Program objectives
3.) Double Degree Master Program Digital Engineering with Sirindhorn International Institute of Technology (SIIT) at Thammasat University in Thailand

Appendices:

1. Study and examination schedules for the Master's degree courses Data & Knowledge Engineering, Digital Engineering and Visual Computing

Appendix A: Study and examination schedule Data & Knowledge Engineering

The study course "Master MDKE" consists of a series of topics that are stated in the study and examination schedule below. Each subject area contains the numbers of CPs (or the minimum and maximum numbers) which must be obtained:

1. In the subject area "Fundamentals of Data Science", modules with 12-18 CP must be selected.
2. In the subject area "Learning Methods & Models for Data Science", modules with a total of at least 18 and at most 36 CP must be selected.
3. In the subject area "Data Processing for Data Science", modules with a total of at least 18 and at most 30 CP must be selected.
4. In the subject area "Applied Data Science", modules with a total of at least 18 and at most 24 CP must be selected.
5. For "Applied Data Science", a team project (6 CP) is required.

This study and examination schedule is a recommendation, which considers these general requirements. Students may deviate from this recommendation by selecting modules from the areas in different order or in different intensity.

Legend for study and examination schedule:
CP = Credit Points

No		1st Semester (CP)	2nd Semester (CP)	3rd Semester (CP)	4th Semester (CP)	Σ
1.	**Fundamentals of Data Science (12-18 CP)**	12				12
2.	**Learning Methods & Models for Data Science (18-36 CP)**	12	12	12		36
3.	**Data Processing for Data Science (18-30 CP)**	6	6	12		24
4.	**Applied Data Science (18-24 CP)**		12	6		18
6.	**Master's Thesis (30 CP)**				30	30
	Σ CP	30	30	30	30	120

Appendix B: Study and examination schedule Digital Engineering

The study course "Master Digital Engineering" consists of a series of topics that are stated in the study and examination schedule below. For each subject area, the minimum number of CPs to be obtained is specified:

1. In the subject area "Fundamentals of Computer Science" a selection of modules with at least 15 CP (if no bachelor's degree in computer science exists) or at least 5 CP (if a bachelor's degree in computer science exists) must be taken. **If the previous Bachelor Degree is not from Computer Science, students must take the modules "Introduction to Computer Science for Engineers" and "Introduction to Software Engineering for Engineers" in this subject area. Students with German language proficiency can alternatively choose 10 CP from the courses "Algorithmen und Datenstrukturen", "Einführung in die Informatik" and "Software Engineering". Students can be exempt from this if they can demonstrate equivalent qualifications otherwise.**
2. In the subject area "Engineering Fundamentals" a selection of modules with at least 5 CP (if no bachelor's degree in computer science exists) or at least 15 CP (if a bachelor's degree in computer science exists) must be obtained.
3. In the subject area "Methods of Digital Engineering" modules with at least 10 CP have to be selected.
4. In the subject area "Methods of Computer Science" a selection of modules with at least 10 CP must be taken.
5. In the subject area "Technical Specialization" modules with at least 15 CP must be chosen.
6. In the subject area "Human Factors" a selection of modules with at least 5 CP is required.

In addition, 12-18 CP of projects must be completed, including a minimum of 6 CP in a Digital Engineering project, and a maximum of 6 CP in an interdisciplinary team project. Digital Engineering projects are offered as 12 CP and as 6 CP projects. If only 12 CP are taken as projects, another 6 CP are to be taken in the area of specialization. The remaining CPs can be freely combined from modules of the study course.

The attached study and examination schedule is a recommendation for the arrangement of the subject areas. The students may deviate from this recommendation by taking modules in a different order.

Legend for standard study plan:
CP = Credit Points

No	Topics	1st semester	2nd semester	3rd semester	4th semester	
1	Fundamentals of Computer Science	15 or 5				
2	Fundamentals of Engineering	15 or 5				
3	Human Factors	5				
4	Methods of Digital Engineering		10			
5	Methods of Computer Science		10			
6	Interdisciplinary Team Project		0 - 6			
7	Technical Specialization		0 - 6	15		
8	Digital Engineering Project			6 - 12		
9	Master's Thesis				30	
	Free Choice	12				
	CP	30	30	30	30	120

The area "Free Choice" can be fulfilled with arbitrary modules from the topic areas 1-5 and 7. It is used to harmonize differences in CP awarded for modules by different faculties.

Appendix C: Study and examination schedule Visual Computing

Topics	1st Sem.	2nd Sem.	3rd Sem.	4th Sem.
Visual Computing	36 – 66 CP			Master's thesis
Computer Science	18 – 42 CP			
Key and Methodological Competencies (SMK)	6 – 12 CP			
	30 CP	30 CP	30 CP	30 CP

In addition to the Master's thesis, a total of 90 CP examinations must be taken, which can be selected individually from the individual areas within the framework of the specified minimum and maximum numbers of CP. The assignment of a course can be found in the module description.

Courses from other faculties that are suitable in terms of content can be included in the compulsory elective area of the three areas upon application.

Subjects in the Field of Visual Computing (all in English)

Compulsory courses	LV	CP
Augmented & Virtual Reality	V/U	6
Introduction to Computer Graphics	V/U	6
Numerical Methods for Visual Computing	V/U	6
Visualization	V/U	6
Scientific team project (in the field of SMK)	P	6
Elective courses	**LV**	**CP**
Computational Geometry	V/U	6
Computer Vision and Deep Learning	V/U	6
Computer-Assisted Surgery	V/U	6
Flow Visualization	V/U	6
Geometric Data Structures	V/U	6
GPU Programming	V/U	6
Human-Computer Interfaces in Medicine	S	3
Mathematics and Numerics of Deep Neural Networks for Physical Simulations	S	3
Medical Visualization	V/U	6
Robust Geometric Computing	V/U	6
Scientific Computing IV	V/U	6
Scientific Computing V	V/U	6
Selected Algorithms in Computer Graphics	V/U	6
Three-dimensional & Advanced Interaction	V/U	6
Visual Analytics	V/U	6
Visual Analytics in Health Care	S	3

If courses in the compulsory area from previously completed work are recognized as equivalent, the required credit points must be earned from the elective area.

Students who have completed a 6-semester Bachelor's degree program (180 CP) and have taken one or more of the courses from the compulsory area do not have to take them again. However, they must still earn 120 CP, which means they will then use more electives. In no case will grades from a previous degree program be included in the calculation of the Visual Computing Master's grade – it is solely a matter of crediting CPs, since a Master's degree with a previous Bachelor's degree requires a total of 300 CP.

2. Program objectives

2.1. Master program Data & Knowledge Engineering

The Master degree program Data & Knowledge Engineering is a Computer Science program with the following focuses:

(I)   Methods I: Data Mining Methods and Methods of Machine Learning

(II)   Methods II: Methods of Information Processing and Search

(III)   Models: Modelling Concepts and Tools for Knowledge Representation and Knowledge Processing

(IV)   Applications: Applications of Data Science and

(V)   Fundamentals: Fundamental methods (on which parts I to V are based.

The Master program Data & Knowledge Engineering is research-oriented. It qualifies for independent scientific work and lays the foundation for further development of Data Science. It prepares for admission to dissertation research leading to a doctoral degree. It qualifies for self-dependent and leading functions in Data Science. It is characterized by scientificity, support of independence, closeness to research, and the ability to judge and make decisions.

The Master program Data & Knowledge Engineering aims to enable students for independent research and development activities in Data Science. They will be familiarized with the methods, functioning and thinking of Data & Knowledge Engineering and will be able to apply and adapt the learned methods and models to new problems. They especially gain competencies that are required to

· successfully handle tasks for the extraction of knowledge from data on a theoretical and practical basis,

· realize decision-making processes through data analysis,

· handle complex problems of data processing for conventional and multimedia data, and

· design and realize solutions for information retrieval, storage and reproduction.

Furthermore, graduates gain expertise about modeling approaches and methods of Data & Knowledge Engineering and insights into the diverse application fields of this subject area. The program enables graduates to take over challenging tasks and leading functions during the planning and realization of MDKE-related projects.

According to the goals stated above, the graduate gained the following qualifications: Knowledge and understanding, and skills (knowledge discovery).

Knowledge and Understanding

Broadening of Knowledge

The graduate is enabled to define, interpret and enhance the characteristics, limitations, terminologies and doctrines in Data Science (divided into the 5 domains stated above).

Deepening of Knowledge
The graduate has a broad, detailed and critical understanding of knowledge in Data Science and is able to responsibly design, implement and evaluate methods of Data & Knowledge Engineering and to apply them to real problems.

Skills (Knowledge discovery)
The graduate can apply his or her knowledge to solve problems related to Data Science. He/she can develop new methods and recognizes which available methods are applicable to a Data Science problem, and how they should be augmented, if necessary.

2.2. Master program Digital Engineering

Digital Engineering is a special educational program that takes account of the increasing software penetration in technical disciplines. This causes new challenges that can only be mastered through interdisciplinary thinking. The Master program aims to convey such cross-disciplinary education to the students. Hence, they can choose between the engineering disciplines: electrical engineering, mechanical engineering, logistics and information technology (as well as related disciplines).

The Master program Digital Engineering can be studied by graduates with a Bachelor degree in Computer Science or in an Engineering discipline. Depending on the students' background, a variable study plan is applied. Students with background in an Engineering Science choose more subjects in Computer Science than in an Engineering discipline. On the contrary, students with background in Computer Science choose more subjects in an Engineering discipline than in Computer Science.

The Master program Digital Engineering is research-oriented. It broadens and deepens the in-depth knowledge acquired in a respective Bachelor program, qualifies for independent scientific work, lays the foundation for further development of the subject and prepares for admission to dissertation research leading to a doctoral degree. Particularly, it qualifies for self-dependent and leading functions and is characterized by scientificity, support of independence, closeness to research, and the ability to judge and make decisions. The interdisciplinary relation is further strengthened. Thus, the amount of practical, interdisciplinary teamwork in individual projects is very high. Cross-disciplinary cooperation and social competence are especially supported.

The Master program Digital Engineering deepens the knowledge of mathematical and computational methods, the programming-related handling of complex problems, the ability to work in teams, the sensitization for non-technical requirements as well as the familiarization with aspects of the interdisciplinary field.

The specific goals are:
- Graduates have worked up the educational objectives of the Bachelor program during a longer subject-specific process. They became more secure in applying and realizing professional and extracurricular competencies.
- They possess profound knowledge in a selected focus area of Computer Science.
- They can quickly familiarize with future technologies and topics related to their own subject area.
- They are able to successfully apply the acquired methods of computer science for the formulation and solution of complex tasks in research and development in industry or in research institutions, to critically question them and to develop them further if necessary.
- They gained different technical and social skills that prepare them for managerial functions (abstraction capability, system-analytic thinking, team and communication skills, international and intercultural experiences).
- They became acquainted with scientific work in fundamental research.

The study organization of the Master program Digital Engineering is rather self-determined. Since the program offers more freedom of choice and integrates research, students can evolve into more mature scientists.

2.3. Master program Visual Computing

Visual Computing deals with the generation, modification and analysis of visual data in the broadest sense. The goal of the Master's program Visual Computing is to provide students with the methodological competencies to develop efficient algorithms and procedures that implement this in a task-oriented manner. The program is research-oriented and lays the foundation for independent research and development work in an academic or industrial environment.

The Master's program can be studied by graduates with a Bachelor's degree in computer science or a related discipline, e.g. mathematics, physics, medical engineering, or an engineering science. It is aimed at students with previous knowledge in one or more areas of visual computing who wish to expand their knowledge and pursue a professional career in this field.

The study program deepens the mastery of mathematical and informatics methods of visual computing, the competence in the programming-technical processing of complex problems in this area, as well as the ability to work in teams organized by division of labor. Concrete goals are:

- Graduates are confident in the targeted use and implementation of the basic algorithms and techniques of visual computing.
- They have the depth and breadth to quickly familiarize themselves with future techniques as well as with the peripheral areas of their own subfield of visual computing.
- They can independently acquire new techniques in the literature and adapt and develop them for an application.
- They can formulate tasks from application goals (e.g. in medicine or the engineering sciences), which can be addressed with the methods of visual computing.
- They have the social skills (team and communication skills, international and intercultural experience, etc.) to solve complex tasks in cooperation with others or to lead a team for this purpose.
- They have gained an insight into scientific work in basic research.

The achievement of these goals is ensured by in-depth lectures on the basics of visual computing in the first semester and a deepening and specialization in the sub-areas of visual computing, e.g. computer vision, visualization and computer graphics, in the following studies. In the third semester, students work on a scientific team project, which provides an introduction to scientific work in the field of visual computing and enables students to learn and improve teamwork and communication skills.

3. Double Degree Master Program Digital Engineering with Sirindhorn International Institute of Technology (SIIT) at Thammasat University in Thailand

The possibility to study the Digital Engineering program as a Double Degree with Sirindhorn International Institute of Technology (SIIT) at Thammasat University (Thailand) is based on the cooperation agreement between OVGU and SIIT in the version from June 28th, 2016.

For students from SIIT as home university the study structure is as follows:

Se-mester	Univer-sity	Module
1	SIIT	Technical Specialization (3 CP) Human Factors (6 CP) Basics of Computer Science (9 CP) Basics of Engineering (18 CP)
2	OVGU	DE-Project (12 CP) Interdisciplinary Team Project (6 CP) Methods of Computer Science (12 CP)
3	SIIT	Methods of Digital Engineering (9 CP) Technical Specialization (18 CP)
4	SIIT	Master's Thesis (30 CP)

There is no prescribed study structure for students from OVGU. However, they have to adhere to all regulations of both institutions. AN exemplary study structure is as follows:

Se-mes-ter	Univer-sity	Module
1	OVGU	Basics of Computer Science (6 CP) Basics of Engineering (15 CP) Methods of Computer Science (3 CP) Human Factors (Student Conference: 6 CP)
2	SIIT	Methods of Digital Engineering (e.g. ET601, ET665: 18 CP) Technical Specialization (12 CP)
3	OVGU	DE-Project (12 CP) Interdisciplinary Team Project (6 CP) Methods of Computer Science (9 CP) Technical Specialization (3 CP)
4	OVGU	Master's Thesis (30 CP)

§ 1
Number of Admissions

(1) The maximum number of applicants to be admitted each year/study cycle (admission number) is set at 12 students for the whole program.

(2) During time, the total number of students admitted can be changed by the admission committee 6 months in advance of the admission deadline for the next year/study cycle (e.g. related to the laboratory and workplace capacities available). Additionally, the number of exchange students from SIIT at OvGU and vice versa in locally admission-restricted study programs is limited by the maximum capacity of students in the respective semester.

§ 2
Application for Admission

(1) Applications for admission have to be presented at one of the partner institutions within the date specified in the announcement of the respective year and will be evaluated by the home university of the student according to the requirements set out in § 3.

(2) The following documents must be handed in by students of both universities for an application:
- Letter of motivation (English)
- Curriculum vitae (English)
- Proof of successful completion of the bachelor program (bachelor diploma and transcript of records)
- Proof of the required knowledge of the English language (see § 3).

(3) Applicants, who miss the application deadline or fail to provide the required documentation, will not be admitted.

§ 3
Admission Requirements

(1) To apply at the Double Degree program applicants have to fulfil the admission requirements of the Master "Digital Engineering" at OvGU as well as the Master "Engineering Technology" at SIIT.

(2) Applicants with a non-English speaking background have to provide an internationally accepted language certificate or an equivalent proof, showing that their active and passive language skills correspond to Level C1 of the Common European Reference Framework for Language.

§ 4
Selection Process and Decisions of the Admission Committee at the respective Institution

(1) If the number of applicants fulfilling the requirements outlined in § 3 exceeds the maximum number of study places set by the host university for the particular year/study cycle, the following rules apply to rank the candidates in each partner institution:

(2) The candidates are ranked by their grade point average score of the first degree (final overall mark for the degree, etc.).

(3) If the first rule does not lead to a final ranking list, then the host university reserves the right to call interviews to determine a final ranking list of candidates. The final decision shall be based on the competences and soft skills relevant to the double degree program.

§ 5
Notification of Admission and Acceptance of Study Places by the selected students

(1) The names of those students ranked in the admission process will be published by the admission committee on the official website of that university where the student applied. Students will be notified via an official letter from the host university.

(2) Admitted candidates have to enroll to the Double Degree program within the defined date by both universities. In the case of non-enrolment within the deadline the right of enrolment will become void. If study places remain or become vacant through non-enrolment of admitted candidates, those study places can be offered to the next ranked applicants. The rules for ranking outlined in § 4 apply to this "succession" process accordingly.

§ 7
Length and Structure of the Program

(1) The standard program duration is four semesters.

(2) To obtain the "Double Degree" from SIIT (Master of Engineering in Engineering Technology) and OVGU (Master of Science in Digital Engineering):

    a) Students have to spend at least one regular semester at the host university and obtain at least 30 CP (ECTS). Credit points from internships or Master's thesis do not count towards these.

    b) The modules chosen at the home and host universities have to be completed successfully based on the respective study and examinations regulations.

    c) The Master's thesis has to be completed successfully, supervised and graded by one examiner from the home university and one examiner from the host university.

(3) Due to the different credit point systems at OvGU (ECTS credits) and SIIT (Thai credits) the following credit point conversion will be used: All courses, except for the Master's thesis, will use a ratio of three to one, meaning that one Thai credit at SIIT is worth three ECTS credits at OvGU and vice versa. For their Master's thesis, if accepted, students from OvGU are awarded 30 ECTS credits at OvGU and students from SIIT are awarded 15 Thai credits at SIIT.

(4)   Students elaborate a Master project at the home or host university, which is documented by an English-language Master's thesis, and finish the program with a final scientific colloquium at the home university, in which the results of the project are presented and discussed in a critical manner (thesis defense). The supervision and review occurs by a supervisor from the home or host university.

§ 9
Teaching and Exam Language

Both the language of formal instruction and exam will be English.

§ 10
Examinations

Examinations for the individual lectures and classes, as listed in Annex 2, are performed by the teaching faculty and/or a board of examiners of the partner institutions according to their own rules and regulations.

§ 11
Grading of Individual Exams and Final Grades

Exams are marked according to the respective national grading system (Annex 1). Conversion of grades obtained at the partner institution into the grading system of the home university are performed following the conversion rules in the Annex.

Minimum grades for passing an individual exam:

Country	Grade	Denotation
Germany	4.0	satisfactory
Thailand	D	minimum

Maximum grades for passing an individual exam:

Country	Grade	Denotation
Germany	1.0	excellent
Thailand	A	excellent

When calculating the overall grade after the final exam the respective study and exam regulations of the master programs at the home university (Master "Digital Engineering" for OvGU and Master "Engineering Technology" at SIIT) are applied. The conversion table in Annex 1 shows the applied final grades in Thailand (SIIT) and Germany (OvGU).

§ 13
Academic Degree

(1)   After the final exam has been passed, the home university will award the academic degree "Master of Science" (abbr. "M.Sc.") (OVGU) or "Master of Engineering" (abbr. "M.Eng.") (SIIT).
- o OVGU: M.Sc. in Digital Engineering
- o SIIT: M.Eng. in Engineering Technology

(2)   The home university will issue a certificate to this effect indicating the day of the Master's thesis exam. Students are issued, in accordance with the partners' exam regulations, a certificate of the passed final exam, a diploma on the awarding of the academic degree, and a diploma supplement. The certificate, official document and "Diploma Supplement" from the partners shall be combined in such a way that it is clear that they relate to the assessment and completion of only a single course of study. They shall be awarded at the university where the student was initially enrolled.

Both documents are only valid with the respective counterpart.

(2)   The Alumni has the right to carry the degree title either in the form common in Germany or Thailand.

(3)   If the student is still at the host university at the time of the presentation, the certificate, official document and "Diploma Supplement" may also be handed over by the host university.
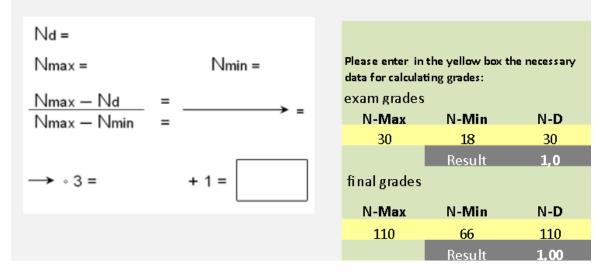
Annex

Used formula for conversation: Modified Bavarian Formula

Modified bavarian formula
for conversion of foreign grades

This grade conversion is a help in the recognition of grades achieved abroad

Nmax	highest attainable grade in foreign system
Nmin	lowest sufficient grade in the foreign system
Nd	grade to be translated into the german system

$$N = 1 + 3 \cdot \frac{P_{max} - P}{P_{max} - P_{min}}$$

Nd =

Nmax =   Nmin =

$$\frac{Nmax - Nd}{Nmax - Nmin} = \longrightarrow =$$

$$\longrightarrow \cdot 3 = \qquad + 1 = \boxed{}$$

Please enter in the yellow box the necessary data for calculating grades:

exam grades

N-Max	N-Min	N-D
30	18	30
	Result	1,0

final grades

N-Max	N-Min	N-D
110	66	110
	Result	1,00

Screenshot conversation calculator

The result is rounded to the nearest German grade (e.g., 1,6 -> 1,7; 2,4 -> 2,3). If the result of the formula is exactly between two German grades, it is rounded to the better mark (e.g., 2,5 -> 2,3; 1,15 -> 1,0).

Conversion Table Exam Grades

Table 1: Grade Conversion for Bachelor Degree

OVGU Grade	Thailand Grade System for Undergraduate Level	
	Grade	GPA (Highest (4.0), Lowest (0.0))
1.0 (excellent)	A (excellent)	4.0
1.3 (good)		
1.7 (good)	B+ (good)	3.5
2.0 (good)		
2.3 (good)	B (good)	3.0
2.7 (fair)	C+ (fair)	2.5
3.0 (fair)	C (fair)	2.0
3.3 (fair)		
3.7 (satisfactory)	D + (poor)	1.5
4.0 (satisfactory)	D (minimum)	1.0
5.0 (inadequate – failed))	F (failed)	0.0

Table 2: Grade Conversion for Master's Degree

OVGU Grade	SIIT Grade for Master's Degree Level	
	Grade	GPA (Highest (4.0), Lowest (0.0))
1.0 (excellent)	A (excellent)	4.00
1.3 (good)	A– (good)	3.67
1.7 (good)	B+ (good)	3.33
2.0 (good)	B (good)	3.00
2.3 (good)	B– (good)	2.67
2.7 (fair)	C+ (fair)	2.33
3.0 (fair)	C (fair)	2.00
3.3 (fair)		
3.7 (satisfactory)	D (poor)	1.00
4.0 (satisfactory)		
5.0 (inadequate – failed))	F (failed)	0.00
	For thesis/dissertation/independent study, the academic performance is measured by the following grades:	
	NP	Not Progress
	S	Satisfactory
	SP	Satisfactory and Progress
	U	Unsatisfactory