

University of Tübingen exam regulations for the study program in Quantitative Data Science Methods – Psychometrics, Econometrics and Machine Learning culminating in an examination for a Master of Science (M. Sc.) – General Provisions

In accordance with §§ 19 (1) sentence 2 nos. 7 and 9, 32, para. (3) LHG of 1 April 2014 (GBl. p. 99), most recently amended by article 1 of the law dated 13 March 2018 (GBl. p. 85), the University of Tübingen Senate on 06.02.2020 passed the General Provisions of these exam regulations for the study program Quantitative Data Science Methods: Psychometrics, Econometrics and Machine Learning culminating in an examination for a Master of Science (M. Sc.).

Approved by the President and Vice-Chancellor on 07.02.2020.

Contents:

General

I General Provisions

- § 1 Structure of the Master's program
- § 2 Graduation
- § 3 Subjects
- § 4 Board of examiners
- § 5 Examiners and observers
- § 6 Crediting of studies, coursework and assessed work

II. Examinations in the Master's program/ Master's examination

- § 7 Purpose of examination
- § 8 Workload and nature of the Master's examination
- § 8a Timing of Master's examination

III. Coursework and module-specific assessment

- § 9 Obtaining ECTS credits
- § 10 Coursework and module-specific assessment
- § 11 Registration and admission to module-specific assessment
- § 12 Oral assessment
- § 13 Written assessment
- § 14 Grading of assessed work

IV. Master's thesis

- § 15 Prerequisites for admission to the Master's thesis process and other possible oral examinations to be completed in the final phase of the program
- § 16 Admission procedure
- § 17 Master's thesis

V. Passing/ Failing exams

- § 18 Passing/ Failing exams

VI. Repetition of a failed exam

- § 19 Repetition of module-specific assessment
- § 20 Repetition of the Master's thesis and other possible oral examinations to be completed in the final phase of the program

VII. Master's overall grade

- § 21 Calculation of the overall grade

VIII. Certificates

- § 22 Certificate and other documentation
- § 23 Degree certificate

- § 24 Certification in the event of an overall fail
- IX. Closing remarks
 - § 25 Absence, withdrawal, deception, breach of regulations
 - § 26 Protection provisions
 - § 27 Invalidity of an examination or assessed coursework
 - § 28 Inspection of examination files
 - § 29 Effective date and transitional arrangements

I General Provisions

§ 1 Structure of the Master's program

(1) ¹In the Quantitative Data Science Methods – Psychometrics, Econometrics and Machine Learning program culminating in an examination for a Master of Science (M. Sc.) (hereinafter: Master's program) the European Credit Transfer and Accumulation System (ECTS) is used, i.e., all components of the program are allocated ECTS credit points, the number of which is in line with the student's foreseeable workload. ²One credit point assumes a workload for the students of 30 hours in class and in private study, unless otherwise stipulated in the module handbook.

(2) ¹The Master's program has a modular structure. ²The type, contents and workload of the required modules and the credit points allocated to them are set out in the Special Provisions of these exam regulations and/or in the module handbook.

(3) The Master's program is tied to a University system of assessment.

(4) ¹The program encompasses 120 ECTS credit points, of which 30 are given for the Master's thesis and 90 for the other subject-relevant coursework. ²In addition to the Master's thesis, an oral final examination at the end of the Master's program, an oral examination on the contents of the Master's thesis and/or a final colloquium on the Master's thesis may be required; this will be set out in the exam regulations or in the module handbook. ³For the Master's degree, 300 ECTS credit points are required – including the student's preceding studies up to his/her first professional degree.

(5) ¹The regular duration of study for this program up to the obtaining of the academic degree is 4 semesters, including all the required coursework and assessment as well as any other required elements such as excursions and internships. ²All coursework and assessment, including exams, set out in these exam regulations may be carried out ahead of the appointed time, if the student meets the necessary prerequisites and there is sufficient capacity. ³In tiered programs leading to a Bachelor's degree and a Master's degree building upon it, the overall regular duration of study is set at a maximum of five years.

(6) The Special Provisions may require students to carry out practical work serving the aims of the course. ²A period of study abroad may be provided for in the Special Provisions of these exam regulations.

§ 2 Graduation

The academic degree "Master of Science" (abbr. "M.Sc.") is awarded on the basis of a successful completion of a Master of Science examination.

§ 3 Subjects

¹A Master's-level subject is studied in the Master's program. ²Elective modules are listed in the Special Provisions of these exam regulations and are to be specified in the module

handbook published for the semester.

§ 4 Board of examiners

(1) ¹The Economics and Social Sciences Faculty forms an examination board for the organization of exams and all other tasks not expressly assigned elsewhere by these exam regulations. ²The head of the board of examiners, his/her deputy on the board, the board members and their deputies are each appointed by the Faculty. ³The examination board is composed as follows:

1. 3 members of the Faculty's full-time academic staff,
2. 2 members of the Faculty's academic staff,
3. 1 student (with advisory role),
4. The head of the examinations office (in an advisory capacity).

⁴Only a professor may be head of the board or its deputy; the head of the board and his/her deputy should be from two different departments. ⁵The head of the board will usually conduct the board's active business. ⁶In addition, the board may transfer revocably certain tasks to the head of the board, insofar as this is not expressly barred; not, however in decisions on appeals. ⁷The board of examiners may receive the support of an examinations office to carry out its active business. ⁸Decisions by the board of examiners are passed with a majority of the board members' votes; in the event of a tie, the head of the board casts the deciding vote. ⁹A board member may be reappointed multiple times; if a member withdraws before the end of his/her term of office, a new member is appointed for the remainder of the term of office; members of the board remain in office after their term of office expires until new members are appointed.

(2) The board members' term of office is three years; that of the student on the board is one year.

(3) ¹The examination board ensures that the provisions set out in these exam regulations are met. ²The board is to report regularly to the Faculty on the development of examinations and durations of study including the time taken to finish Master's theses, as well as reporting on the distribution of subject grades and overall grades. ³The examination board must ensure that all coursework and assessment set out in these exam regulations can be carried out by students within the prescribed time periods. ⁴To this end, students must be informed in good time both of the nature and number of required coursework units and the assessed coursework to be successfully completed, as well as on the deadlines by which these must be completed, and similarly the dates for the issue of topics for, and submission of, Master's theses. ⁵The board of examiners must also ensure that protective legal provisions and the provisions under § 32 paragraph (4)(5) LHG are met.

(4) ¹Board of examinations members have the right to be present as observers during examinations. ²The University President or a representative appointed by him/her also has the right to be present at examinations.

(5) ¹Meetings of the board of examiners are not open to the public. ²Members of the board of examiners, their representatives, and any third parties involved are obliged to maintain professional secrecy. ³If they are not state employees, the head of the board must pledge them to maintain confidentiality.

(6) ¹Decisions by the examination board or its head which negatively affect the candidate must be communicated in writing at the earliest possible opportunity to the candidate, explaining the decision; instructions on the right to appeal will be included. ²Appeals must reach the examination board in writing within one month. ³If the examination board does not remedy the appeal, it must be referred to the University's Vice-President of Academic Affairs for decision.

§ 5 Examiners and observers

(1) ¹The board of examiners appoints examiners and observers - insofar as required by these exam regulations - for each exam. ²The board may delegate appointments to the head of the board. ³Suggestions by the candidate for potential examiners may be taken into account; however the candidate does not have the right to have his/her suggestion taken into account. ⁴The observer is to take minutes of the proceedings. ⁵Only persons with a degree in the relevant degree program or equivalent may be appointed as observers.

(2) ¹Only academic teaching staff, academics with habilitation, and other academic staff appointed by the President's Office at the suggestion of the Dean's Office are authorized to conduct examinations. ²Other members of the academic staff, such as assistant lecturers, may act as examiners under exceptional circumstances only, if there are not enough examiners available under item 1 and if they have a qualification in the examined subject which is at least the equivalent of the degree for which the examination is taking place.

(3) ¹For course-related exams, the member of teaching staff under (2) who taught the relevant classes is the examiner unless some other arrangement is made; the exams are conducted by one examiner, unless some other arrangement is set out in the exam regulations or the module handbook. ²If an examiner is absent, the examination board appoints another person qualified under paragraph (2). ³If a repeat exam is conducted on module-specific coursework within the framework of the regular exam timetable, then the examiner is the member of teaching staff scheduled for this regular exam date; if the repeat exam is not conducted within the framework of regular exam dates, an examiner will be appointed.

(4) § 4 (5) items 2 and 3 apply for examiners and observers accordingly.

§ 6 Crediting of studies, coursework and assessed work

(1) ¹Coursework, assessed work, degrees, and semesters of study completed in study programs at the University of Tübingen, other state-administered or state-recognized institutions of higher education and universities of cooperative education in Germany or in study programs at state-administered or state-recognized institutions abroad will be credited if the competencies thus obtained show no significant difference from the coursework or degrees they replace. ²This accreditation serves the continuation of studies, the completion of exams, the commencement of further studies, or admission to a doctoral program. ³Insofar as equivalency agreements between Germany and other countries favor students from other countries in a way not in accordance with sentences 1 and 2, the equivalency agreements take precedence; in addition accords struck within the framework of university partnerships, collaboration agreements and dual-degree programs must be taken into account. ⁴Intermediate exams completed in the same or in a related study program at the University of Tübingen or another German institution of higher education will be recognized.

(2) Participation in recognized correspondence courses will be treated as the equivalent of on-campus studies and credited accordingly to the duration of study.

(3) ¹Knowledge and skills obtained outside of the higher education system may be credited to studies if:

1. at the time of recognition, the student met the requirements for admission to higher education,
2. the knowledge and skills to be credited to studies are equivalent in content and standard to the coursework and assessment they are to replace, and
3. the criteria for recognition within the framework of accreditation have been assessed.

²Knowledge and skills obtained outside of the higher education system may be credited to studies to a maximum of 50 percent of a university study program. ³There must be a careful

check to ensure that knowledge and skills obtained outside the higher education system are, in the nature and volume of coursework they replace, equivalent regarding the competencies obtained. ⁴When the decision is made, the form in which the competencies were learned must be taken into consideration.

(4) ¹If coursework and assessment are recognized, the grades are to be transferred - insofar as the grading schemes are comparable - and taken into account in the overall grade according to the key to grading set out in § 14. ²If the grading schemes are not comparable, a note is made of a "pass," and in this case the result will not be included in the calculation of module grades or the overall grade and the rules regarding its calculation are applied in consideration of this. ³Accredited grades may be identified as such in the Transcript of Records. ⁴In addition, the examination board may establish regulations for the conversion of grades given at another institution of higher education, particularly those of a partner university.

(5) ¹It is up to the applicant to provide the necessary information about the work to be accredited. ²The onus is on the office carrying out the accreditation process to show that an application for accreditation does not meet the requirements. ³Decisions on academic certificates from outside Germany are to be made with reference to the assessment criteria set out by the Zentralstelle für ausländisches Bildungswesen at the secretariat of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder of the Federal Republic of Germany (ZAB).

(6) ¹For credit points from senior studies (Kontaktstudien) to be credited to a university study program, paragraphs (1), (2)(4) items 1-3 and (5) apply accordingly, if the prerequisites for admission to university were met at the time of crediting.

II. Examinations in the Master's program/ Master's examination

§ 7 Purpose of examination

¹The Master's examination comprises a further professional qualification degree which goes beyond the first degree in the field of Statistics/ Data Science. ²In completing the Master's examination, students demonstrate that they have obtained well-founded basic knowledge beyond that gained in a first degree and a systematic orientation and in-depth proficiency in a relevant subject and have developed the ability to process academic questions in their Master's subject independently using the relevant methods.

§ 8 Workload and nature of the Master's examination

(1) ¹Along with the required coursework and other possible required additional work, the Master's examination consists of course-related assessed work as well as the Master's thesis and any exam which may be required at the end of the Master's degree studies, any required oral exam on the contents of the Master's thesis and/or a final colloquium which may be required as part of the thesis process; the Master's examination has been passed when these have been successfully completed. ²Regulations are set out in the Special Provisions and/or in the module handbook as to which module-specific assessment is relevant for the final grade and must be completed in which modules.

(2) The type and workload of the assessed coursework and the demands of the examinations as well as any other, particular requirements for admission are set out in the Special Provisions of these exam regulations.

(3) The module handbook contains the following information regarding the individual modules:

1. Name of the module,
2. Content and goals,
3. Teaching method(s) according to § 4 sentence 1 of the Special Provisions,
4. Prerequisites and limitations on admission,
5. Interchangeability of module and recommended semester,
6. The credit points set out in these exam regulations, the requirements for obtaining them, in particular the demands of each examination, as well as whether grades are given,
7. The frequency with which modules are offered,
8. Workload and duration of classes.

§ 8a Timing of Master's examination

¹The Master's examination must be concluded by the end of the 4th semester - in line with the prescribed regular duration of study. ²If this deadline is not met, the student will be informed that he/she will lose the right to be examined if he/she does not complete his/her Master's examination by the end of the seventh semester. ³If the Master's examination, including any repeat assessment, has not been concluded by the deadlines set out in 2 above, the student's right to be examined expires, unless the failure to meet the deadline was due to reasons beyond the student's control. ⁴The board of examiners shall decide on this matter; this may be done upon application by the student.

III. Coursework and module-specific assessment

§ 9 Obtaining ECTS credits

(1) ¹The ECTS credits designated to each class, module, or other coursework are to be allocated when all required assessed coursework and/or non-assessed coursework as well as any required further work has been successfully completed. ²ECTS credits are allocated for graded work regardless of the grade given, as long as it is "sufficient" or better.

(2) ¹Regulations are set out in the Special Provisions and/or in the module handbook as to which assessed and non-assessed coursework and any further work is required and in which modules and/or classes assessed coursework must be completed. ²If assessed coursework must be completed in a class or module, additional assessed and non-assessed coursework as well as further supplementary work may be required for the student to obtain the ECTS credits allocated to this class or module. ³In those classes and/or modules in which no assessment is required, the relevant ECTS credits are obtained via the completion of non-assessed coursework and any supplementary work.

(3) The type, form, number, and scope of the required pieces of assessed and non-assessed coursework and any supplementary work are to be fundamentally agreed in such a way that the time required to complete it is in line with the ECTS credits assigned to the relevant class and/or the relevant module.

§ 10 Coursework and module-specific assessment

(1) ¹Coursework consists of individual written, verbal, or practical work conducted by the students usually in connection with classes. ²The coursework completed must be evaluated by the person responsible for the relevant class. ³Coursework may be provided for in an ungraded form.

(2) ¹Module-specific assessment for the purposes of these exam regulations is the final assessment (including any relevant repeat assessment) in each module; it may also be calculated overall from several components. ²The Special Provisions of these exam

regulations and/or the module handbook set out what type of final exam is to be completed in each module: Oral and/or written and/or practical. ³The Special Provisions of these exam regulations may also allow for other supervised assessed coursework, to be appraised according to the same standards. ⁴The Master's thesis and any associated oral Master's examinations, associated colloquia and oral exams on the contents of the Master's thesis are not course-related.

(3) The nature and workload of module-specific assessed and non-assessed work and any supplementary work, as well as the time for its completion, must be made known to all students taking part by the person responsible for the class - usually at the beginning of the class.

(4) ¹If a candidate can show credibly, by presenting a doctor's certificate, that he/she is unable to complete assessed coursework in whole or in part in the form provided for due to lingering or constant medical condition, impairment or disability, the head of the board of examiners will allow him/her an extension in which to complete the assessed coursework or equivalent assessed coursework in a different form, upon application by the candidate. ²The same applies to coursework and any other relevant work. ³This also applies in the event of illness of a child solely or chiefly in the candidate's care.

(5) ¹Students on leave are not entitled to attend classes or to take part in module-specific assessment which must be completed as part of a class. ²Students on leave under § 61 (3) LHG (maternity leave, parenting leave, carer's leave) have the right to take part in classes and to carry out coursework and assessed work. ³The details of this are set out in the paramount regulations governing admission and enrollment at the University of Tübingen, as amended.

(6) ¹The manner, content, and scope of the non-assessed coursework and module-specific or other assessment, the requirements for assessment as well as any other required supplementary work and any further, particular requirements for admission may be set out in the module handbook. ²However, provisions set out in the exam regulations take precedence over those set out in the module handbook.

(7) The head of the board of examiners ensures that each exam date is announced in good time.

§ 11 Registration and admission to module-specific assessment

(1) Students must register for every piece of module-specific assessment by a date set by the examination board in accordance with the provisions set out by the examination board.

(2) ¹A student can only be admitted to module-specific assessment if he/she:

1. meets the requirements for admission to this degree course and is enrolled at the University of Tübingen in the relevant subject of the Master's program,
2. has not lost the right to be examined in the relevant subject of the Master's program or in a comparable degree program at an institution of higher education,
3. has not failed, with no option to repeat, a Master's or final examination in the relevant subject or in a comparable degree program at an institution of higher education,
4. meets any further necessary prerequisites set out in the Special Provisions.

²Comparable degree programs are (insofar as not otherwise decided by the board of examiners: without the corresponding teaching degree programs in their tiered structure); the board of examiners will decide on the comparability of other degree programs.

(3) ¹The examination board will decide on admission to a piece of module-specific assessment. ²If admission is denied, the student will receive written notification of this within four weeks; this notification must include reasons for the denial and instructions on the right

to appeal. ³Admission will be denied if:

1. the requirements set out in (2) are not met,
2. the application is incomplete and the missing documents were not submitted on time.

⁴Admission may also be denied if the student in the relevant subject of the Master's program or in a comparable degree course under (2) is involved in a current examination process. ⁵No other reasons for denial are permitted.

§ 12 Oral assessment

(1) ¹Oral assessment may be conducted in the form of oral exams, presentations. ²Further forms of assessment may be designated in the module handbook.

(2) ¹During verbal assessment the candidate must demonstrate that he/she recognizes the interrelated themes of the field being assessed and is able to analyze particular issues within these interrelated themes. ²Oral exams also aim to determine whether the candidate has broad-based basic knowledge. ³In addition the candidate may be given the opportunity to nominate special themes as the object of his/her oral exam. ⁴The duration of an oral examination is usually between 15 and 30 minutes per candidate. ⁵The oral examination takes place in the presence of an observer.

(3) ¹An official record must be kept of the main subject-matter and the main results of the oral exam. This official record must be signed by the examiner and, insofar as an observer is consulted, also by the observer. ²The result of the oral examination is to be communicated to the candidate at the conclusion of the oral exam.

(4) ¹The exams are not open to the public. ²Provided there is no objection from the candidate, other students wishing to carry out the same assessment at a later date may be admitted to attend an oral exam as members of an audience, subject to the limits of the examination venue. ³This admittance does not extend to the discussion of exam results, nor to the notification of these to the candidate.

§ 13 Written assessment

(1) ¹Forms of written assessment are chiefly exams, assignments, research reports, and written work submitted as part of a presentation. ²Further forms of assessment may be designated in the module handbook.

(2) ¹In exams and in other written work the candidate demonstrates that he/she is able to recognize a problem and, in a limited time using limited aids, is able to apply methods appropriate to the subject to find ways of solving it. ²The candidate may be given several tasks from which he/she chooses one or more to complete. ³The duration of a written exam should usually be at least 60 minutes and not more than 240 minutes.

(3) ¹An official record must be kept of the proceedings of an exam, recording particular events, especially attempts by a candidate to influence the result by cheating or using unauthorized aids. ²The official record must be signed by the invigilator.

§ 14 Grading of assessed work

(1) ¹Grades for individual assessed work are determined by the relevant examiners. ²The following grades are to be used for grading assessed work:

- | | |
|------------------|--|
| 1 = very good | = an outstanding performance; |
| 2 = good | = a performance well above the average requirements; |
| 3 = satisfactory | = a performance in line with the average |

4 = sufficient	requirements; = a performance which, despite its failings, nevertheless meets the requirements;
5 = insufficient	= a performance which does not meet the requirements due to considerable failings.

³For precise grading of assessed work, whole grades may be raised or lowered by a value of 0.3. ⁴The grades 0.7, 4.3, 4.7 and 5.3 are not given.

(2) The grades in the modules are as follows:

average of 1.50 or less	= very good
average grade of 1.51 to 2.50	= good
average grade of 2.51 to 3.50	= satisfactory
average grade of 3.51 to 4.00	= sufficient
average of 4.01 or more	= insufficient

(3) ¹If the final exam in a module consists of several graded components, the module grade is calculated from the average grades of the individual pieces of assessed coursework, weighted by credit points, unless otherwise set out in these regulations and particularly in the Special Provisions of these exam regulations. ²This average takes into account whole numbers and the first two decimal places only; all further decimal places are deleted with no rounding.

(4) ¹If coursework is assessed by several examiners, the grade will be calculated from the arithmetic mean of the individual assessments. ²Paragraphs (2) and (3) item 2 apply accordingly.

(5) Calculation of the overall Master's grade is set out in § 21.

(6) If assessed coursework from other study programs is credited, the provisions of the relevant other degree program apply to the assessment of the coursework.

IV. Master's thesis

§ 15 Prerequisites for admission to the Master's thesis process and other possible oral examinations to be completed in the final phase of the program

Persons may be admitted to the Master's examination and any oral exam which may be required at the end of the Master's degree studies, oral exam on the contents of the Master's thesis and/or any final colloquium which may be required as part of the thesis process only if:

1. they meet the admission requirements according to § 11 (2),
2. they meet the further subject-related admission requirements set out in the Special Provisions of these exam regulations.

§ 16 Admission procedure

(1) ¹The application for admission (Meldung) to the Master's examination and any oral exam which may be required at the end of the Master's degree studies, oral exam on the contents of the Master's thesis and/or any final colloquium which may be required as part of the thesis process must be submitted to the examination board in writing. ²This application must include details of the relevant study program and the candidate's suggested examiner where appropriate. ³The application must be accompanied by:

1. the student's Studienbuch or equivalent academic records,

2. documentation that the requirements set out in § 15 nos. 1-2 have been met,
3. a declaration on whether the candidate has ever lost the right to take an exam in a Master's program or equivalent program under § 11 (2) at an institution of higher education or has ever failed, with no option to re-sit, a piece of module-specific assessment required by the exam regulations or a Master's or final examination in the relevant subject or in a comparable degree program under § 11 (2) at an institution of higher education and whether he/she is currently involved in an examination process in the same or under § 11 (2) equivalent degree program.

(2) If the candidate cannot provide documentation as required under (1) in the manner stipulated, the examination board can in individual cases allow evidence to be shown in some other way.

(3) The board of examiners will decide on admission.

(4) ¹The candidate is considered admitted if his/her application is not rejected within two weeks. ²The application must be rejected if the requirements for admission have not been met. ³Admission may also be denied if the student in the relevant subject of the Master's program or in a comparable degree course under § 11(2) is involved in a current examination process. ⁴No other reasons for denial are permitted. ⁵Reasons for rejecting an application must be given in writing.

§ 17 Master's thesis

(1) ¹The Master's thesis is a piece of assessed work. ²It is meant to demonstrate that the author is able to process a problem independently and by applying academic methods within a set time and to present the results thus arrived at appropriately and in written form. ³The topic must be drawn from the field of specialization; generally it should be set by an examiner under § 5 in the second year within the framework of the Master's thesis module. ⁴If the student does not find a topic for his/her Master's thesis, the head of the examination board ensures, upon written application, that the student receives a topic for his/her Master's thesis in good time. ⁵The topic is issued via the board of examiners; the time of issue and the topic must be recorded. ⁶The student is to be given the opportunity to make suggestions for a Master's thesis topic; however the examination board is under no obligation to consider such suggestions.

(2) ¹The time limit for writing a Master's thesis - from the issuing of the topic to submission of the thesis - is 26 weeks; the topic must be set out and the task must be formulated by the thesis supervisor in such a way that the Master's thesis may be completed within this time limit. ²The deadline for submission may be extended upon application by the examination board if there is good reason.

(3) ¹The student should write the thesis in English unless otherwise set out in the Special Provisions of these exam regulations; the examination board will decide on applications to write the thesis in any other language. ²The finished Master's thesis must be submitted to the examination board within the allotted time as three bound copies and in a file format determined by the examination board. ³The time of submission must be recorded. ⁴Along with the printed text, the Master's thesis may contain multimedia parts on electronic data storage media, if the topic requires it. ⁵The process of evaluation must be completed 4 weeks at the latest after submission of the thesis; it is the examination board's task to supervise this deadline. ⁶If examiners are prevented from keeping the deadline due to illness or some other circumstance, the examination board may appoint other examiners in this respect.

(4) The candidate must include with the submitted Master's thesis a signed declaration in which he/she ensures that he/she wrote the thesis - or in the case of a joint project, his/her

correspondingly marked part of the work - independently, did not use any sources or resources other than those cited, that he/she has clearly indicated as such all information taken from other works - either verbatim or paraphrased - and that the thesis has not been submitted as a whole or in any significant part as part of any other examination process, and that he/she has not published the thesis as a whole or in any significant part, and that the copy submitted in electronic file form is identical in content to the bound copies submitted.

(5) ¹The Master's thesis is assessed by two people as examiners; one of them may be the thesis supervisor. ²§ 14 (1), and insofar as an assessment by more than one person is required, § 14 (4) apply accordingly. ³If assessment by two people is required and the individual assessments diverge by more than a whole grade as defined in § 14 (1)(2) or if at least one is "insufficient," the head of the examination board must obtain a further assessment from a further examiner.

(6) ¹For any oral exam which may be required at the end of the Master's degree studies, oral exam on the contents of the Master's thesis and any final colloquium which may be required as part of the thesis process, the rules for oral exams apply, unless otherwise set out in the Special Provisions of these exam regulations or in the module handbook. ²They are assessed by one examiner and take place in the additional presence of an observer; for grading, § 14 applies.

(7) The Master's thesis may also be admitted in the form of a group project, if the individual candidate's contribution can be clearly identified and assessed by means of sections, page numbers or other objective criteria which make a clear distinction possible, and if the contribution meets all other requirements.

V. Passing/ Failing exams

§ 18 Passing/ Failing exams

(1) ¹A piece of assessed work passes if it is given the grade of 4 (sufficient); a final exam in a module comprising several graded components passes if the module grade is at least 4 (sufficient) and each component has been graded at least 4 (sufficient). ²The Master's examination and any oral exam which may be required at the end of the Master's degree studies, oral exam on the contents of the Master's thesis and any final colloquium which may be required as part of the thesis process pass if they are given the grade of 4 (sufficient); each of these pieces of assessed work must pass.

(2) ¹If the candidate fails a piece of assessed coursework or the Master's thesis, the head of the examination board communicates this to him/her, including information on the right to appeal and on whether and to what extent the assessment may be repeated. ²Apart from cases of failure in the Master's examination, notification of assessment results may be announced in other ways. ³For any oral exam which may be required at the end of the Master's degree studies, oral exam on the contents of the Master's thesis and any final colloquium which may be required as part of the thesis process, the provisions for the Master's thesis set out in (1) and (2) apply accordingly.

(3) ¹If a candidate fails a piece of assessed coursework with no option to repeat, he/she may apply for a certificate detailing the assessed and (where appropriate) non-assessed coursework he/she has completed along with the grades given as well as the pieces of assessment not achieved, and showing that the candidate did not pass; the application must be accompanied by appropriate documentation and proof that the candidate's enrollment has been terminated. ²This still applies when the candidate's right to be examined has expired.

(4) If assessed coursework from other study programs is credited, the provisions of the relevant other degree program apply to the passing and failing of coursework.

VI. Repetition of a failed exam

§ 19 Repetition of module-specific assessment

(1) ¹Module-specific assessment which results in a fail or which is considered a fail may be repeated twice. ²Registration according to § 11 (1) is considered to be conditional registration for the corresponding repeat exam. ³In a repeat exam, only assessment given a grade lower than “sufficient” (4.0) in the previous exam may be repeated; the grades given for the other pieces of assessment in the previous exam are taken into account in the calculation of the grade.

(2) ¹The repeat exam must be taken - in observance of any deadlines set out in the exam regulations for the Master’s examination - in the same semester or in the semester following the fail in the first exam or at the latest in the semester after that; it is usually conducted within the time and content framework of the scheduled regular exams. ²Failure to repeat a failed exam will result in a grade of “insufficient” (5.0) unless the failure to repeat was not the fault of the student.

(3) If the failed exam or piece of assessment was conducted at least six weeks before the start of lectures in the following semester and if passing a repeat exam is required for admission to a piece of assessment in the following semester or for attendance at a class in the following semester, the student must be given the opportunity - upon written application to the examination board - to re-sit the failed exam in good time so as to be able to be admitted to the assessment or attend the class.

(4) There must usually be a period of at least four weeks between notification of results in the first exam and the repeat exam.

(5) ¹In the case of a repeat exam which is not conducted within the framework of regular exams in the following semester, the type of assessment to be completed may diverge from the type of assessment set out in the subject-specific provisions, particularly those in the module handbook, insofar as the subject-specific circumstances require it. ²The student must be notified of the type and volume of assessment to be completed in the repeat exam at the time of notification of the repeat exam date at the latest.

(6) Assessment resulting in a pass cannot be repeated.

§ 20 Repetition of the Master's thesis and other possible oral examinations to be completed in the final phase of the program

(1) ¹A Master's thesis which has failed or which counts as failed may be repeated once; there can be no second repetition. ²The application for a repetition must be submitted two months at the latest after the exam result comes into force; if the student fails to apply in time, his/her right to be re-examined expires, unless the failure to apply is not the fault of the student. ³The topic may be rejected only once and that only within the first 2 months of the time allotted for the writing of the thesis; in this case, the allotted time period for the writing of the thesis begins again from the start. ⁴In the case of a repeat exam, a student may reject the topic only if he/she did not make use of the option to reject a topic when writing the first thesis.

(2) An examination of a Master's thesis resulting in a pass cannot be repeated.

(3) For any oral exam which may be required at the end of the Master’s degree studies, oral exam on the contents of the Master's thesis and any final colloquium which may be required as part of the thesis process, the provisions set out respectively in 1(1) and (2) and in 2 apply accordingly.

VII. Master's overall grade

§ 21 Calculation of the overall grade

(1) If the Master's examination results in a pass, an overall grade is calculated; the relevant decimal grades are to serve as the basis of this calculation.

(2) ¹The Master's overall grade is calculated according to the Special Provisions of these exam regulations. ²For the Master's grade, §14 (2) and §14 (3) item 2 apply accordingly, provided that no other provisions are set out in these exam regulations or in the Special Provisions of these exam regulations.

VIII. Certificates

§ 22 Certificate and other documentation

(1) ¹If the candidate has passed the Master's examination, he or she receives a certificate. ²The certificate details the overall grade and the Master's thesis topic. ³The certificate is signed by the Dean of the Faculty and by the head of the board of examiners. ⁴It bears the date of the day on which the last piece of assessment for the Master's examination was completed. ⁵It is issued in German; an English translation will be issued upon application.

(2) ¹The University issues a diploma supplement (DS) in accordance with the Diploma Supplement Model of the European Union/ Council of Europe/ UNESCO; it describes the profile of the study program as well as a transcript of records, issued in German; an English translation will be issued upon application.

²The transcript of records includes the following:

- modules taken during the course of the Master's program as well as their components and ECTS credit points,
- the grades given in the modules,
- the grade given for the Master's examination and any oral exam required at the end of the Master's degree studies, oral exam on the contents of the Master's thesis and/or any final colloquium required as part of the thesis process.

³Grades are listed in the form of decimal numbers.

(3) ¹The overall grade is supplemented by a relative grade based on the European Credit Transfer and Accumulation System. ²This can be done in particular by listing an ECTS grade according to the following scale

the best 10%	A
the next 25%	B
the next 30%	C
the next 25%	D
the next 10%	E
failed	F

in the certificate or in the transcript of records or insofar as the necessary data are available in accordance with the ECTS Users' Guide via an ECTS grading table (giving the statistical distribution of grades as percentages of the reference group) in the diploma supplement.

³Details on the relative grade are set out by the examination board with regard to European guidelines.

§ 23 Degree certificate

(1) ¹The candidate receives a Master's degree certificate at the same time as the certificate,

including the date. ²It certifies the awarding of the academic degree of Master according to § 2. ³An English translation of the degree certificate will be issued upon application.

(2) The Master's degree certificate is signed by the Dean of the Faculty of Science and by the head of the board of examiners and bears the seal of the University.

(3) The academic title may only be used after the degree certificate has been issued.

§ 24 Certification in the event of an overall fail

(1) Students who have failed the Master's examination with no option to re-sit receive written certification from the examination board, including instructions on the right to appeal.

(2) ¹If the student has failed the Master's examination with no option to repeat, he or she may apply to be issued with certification signed by the head of the examination board, listing the assessed and non-assessed coursework completed and showing that the Master's examination overall was failed with no option to repeat. ²This still applies when the candidate's right to be examined has expired.

IX. Closing remarks

§ 25 Absence, withdrawal, deception, breach of regulations

(1) ¹A piece of assessed work counts as graded "insufficient" if the candidate fails to attend an exam without good reason and without having deregistered him/herself from the exam in the form set out by the examination board and within the period prescribed, or if he/she for no good reason withdraws from the exam after it begins. ²The same applies if a written or practical piece of assessment is not submitted within the allotted time period. ³Deregistration from a written or practical piece of assessment or from the Master's thesis without providing reasons is possible on working days - Monday to Friday - up until the seventh working day before the first day of the examination. ⁴In the case of oral exams, deregistration must take place at the latest on the seventh working day (not counting Saturdays) before the day of the relevant examination.

(2) ¹The reasons given for withdrawing or failing to attend must be communicated in writing and at the earliest possible opportunity to the examination board. They must be credible. ²In the case of illness of the candidate or of a child in his/her sole care a doctor's certificate may be required; in particular cases of doubt, certification by a public health officer may be required. ³If the reasons are recognized, a new date for the exam will be set. ⁴In such a case, the existing exam results must be accredited.

(3) ¹If the candidate attempts to influence the result of his/her assessed work using deception or resources which are not permitted, the relevant work will be given a grade of "insufficient" (5.0). ²A candidate who disrupts the regular proceedings of an exam may be excluded from continuing the exam by the examiner or invigilator; in this case the candidate's assessment for that exam will be a grade of "insufficient" (5.0). ³In severe cases of 1 and 2, the examination board may exclude the candidate from carrying out further assessment.

(4) ¹The examination board decides on the recognition of reasons for absence or withdrawal. ²Within a time limit of one month, the candidate can request that decisions under (3) be reviewed by the examination board.

(5) If assessed coursework from other study programs is credited, the provisions of the relevant other degree program apply to deregistration, absence, withdrawal and deception.

§ 26 Protection provisions

(1) ¹The opportunity to claim statutory time off under the Maternity Protection Act as well as time off for parenting leave in accordance with the relevant law on parental benefits and on parenting leave (Bundeselterngeld- und Elternzeitgesetz – BEEG) is guaranteed. ²The examination board decides on whether to extend such time off periods and for how long upon application. ³The opportunity to meet family obligations under § 32 (1)(2) LHG is guaranteed; the examination board decides on whether to extend such time off periods and for how long, upon application.

(2) ¹Students who are unable to attend classes regularly or are unable to carry out expected assessed and non-assessed coursework or any other work due to lingering illness or due to lingering or permanent disability - without being unable to study - may apply to the examination board to complete their Master's examination within a reasonable period after the planned time limit under these exam regulations. ²The student must stipulate the length of time by which he/she seeks to extend the deadline; the examination board decides on the length of the extension. ³The application must be accompanied by relevant documentation, medical certificates in particular. ⁴In particular cases of doubt, the University may require certification by a public health officer. ⁵The student is obliged to make notification of changes in the prerequisites for extension at the earliest possible opportunity. ⁶The examination board must check to see whether the changes in the prerequisites for extension mentioned above exist in fact and, if they do, the board must notify the student at the earliest possible opportunity of the new time limits.

(3) Activities as an elected member of statutory bodies or organs of the University or of student services (Studentenwerk) during at least one year does not have to be taken into account in the calculation of exam time limits; the decision rests with the University President.

§ 27 Invalidity of an examination or assessed coursework

(1) ¹If the candidate has used deception in a piece of assessed work, the grade for that assessed work may be corrected even if the deception becomes known after the certificate has been issued. ²In such cases the exam or piece of assessed coursework may be declared “insufficient” and the Master's examination a fail, as appropriate.

(2) ¹If the requirements for admission to an exam or piece of assessed coursework were not met, and the candidate did not intend to deceive, and if the fact becomes known only after the certificate has been issued, this fault is remedied by the candidate having passed the exam or piece of assessed coursework. ²If the candidate deliberately obtained admission wrongfully, the pieces of assessment to which the deception applies may be declared “insufficient” and the grades for them corrected accordingly. For pieces of assessment made up of several components, the overall grades may be corrected accordingly and if appropriate in such cases declared “insufficient” - and the Master's examination declared a fail if appropriate.

(3) ¹The candidate must be given a chance to speak on the matter prior to the decision. ²The option of withdrawing the Master's degree under statutory provisions remains unaffected by paras. (1) and (2).

(4) ¹The incorrect certificate as well as any incorrect transcript of records must be confiscated and a new one issued, where applicable. ²Along with the incorrect certificate, the Master's degree is to be confiscated if the exam or piece of assessment has been declared a fail due to deception under (1) or (2) sentence 2. ³There can be no decision under (1) and (2) sentence 2 after a period of five years starting on the date of the certificate.

(5) Paragraphs (1-4) apply accordingly to non-assessed coursework and any other additional

work.

§ 28 Inspection of examination files

(1) For one year following the conclusion of the Master's examination process, graduates are guaranteed the right to inspect their Master's thesis and the examiner's reports relating to it as well as the minutes of any oral exam required at the end of their Master's degree studies, oral exam on the contents of the Master's thesis and/or any final colloquium required as part of the thesis process.

(2) ¹For the inspection of module-specific written assessment and/or of the minutes of module-specific oral exams there is usually a time limit of four weeks after notification of the assessment results. ²Additionally, general times for inspecting certain pieces of assessed work may be offered.

(3) ¹The relevant applications must be made in writing to the head of the examination board. ²The examination board determines the time and date of the inspection.

§ 29 Effective date and transitional arrangements

¹These exam regulations come into effect on the date of their publication in the University of Tübingen's official bulletin, the Amtliche Bekanntmachungen. ²Their first semester of validity is winter semester 2020-21

Tübingen, 07.02.2020

Professor Dr. Bernd Engler
President

University of Tübingen exam regulations for the study program in Quantitative Data Science Methods – Psychometrics, Econometrics and Machine Learning culminating in an examination for a Master of Science (M.Sc.) degree – Special Provisions

In accordance with §§ 19 (1) sentence 2 nos. 7 and 9, 32, para. (3) LHG of 1 April 2014 (GBl. p. 99), most recently amended by article 1 of the law governing the further development of higher education law dated 13 March 2018 (GBl. p. 85), the University of Tübingen Senate on 06.02.2020 passed the Special Provisions of these exam regulations for the study program Quantitative Data Science Methods: Psychometrics, Econometrics and Machine Learning culminating in an examination for a Master of Science (M. Sc.).

Approved by the President and Vice-Chancellor on 07.02.2020.

Contents:

Special Provisions

- § 1 Geltung des Allgemeinen Teils
- I. Ziele, Inhalte und Aufbau des Studiums
 - § 2 Studieninhalte und Studienziele, Regelstudienzeit, Studienumfang, Studienbeginn
 - § 3 Studienaufbau
- II. Vermittlung der Studieninhalte
 - § 4 Arten von Lehrveranstaltungen innerhalb der Module
 - § 5 Studien- und Prüfungssprachen
 - § 6 Arten von Prüfungsleistungen
- III. Organisation der Lehre und des Studiums
 - § 7 Studienumfang
- IV. Master-Prüfung und Master-Gesamtnote
 - § 8 Art und Durchführung der Master-Prüfung
 - § 9 Master-Arbeit
 - § 10 Bildung der Master-Gesamtnote
- V. Schlussbestimmungen
 - § 11 Inkrafttreten, Übergangsregelung

§ 1 Validity of General Provisions

The General Provisions of the University of Tübingen's exam regulations for the study program in Quantitative Data Science Methods: Psychometrics, Econometrics, and Machine Learning culminating in an examination for a Master of Science (M. Sc.) as amended are part of these exam regulations, insofar as no more specific provisions have been made.

I Goals, contents and structure of the program

§ 2 Contents and goals, regular duration of study, scope, start date of program

(1) ¹The Master's program Quantitative Data Science Methods: Psychometrics, Econometrics, and Machine Learning, culminating in an examination for a Master of Science (M.Sc.) degree enables students to acquire the specific qualifications, competencies, knowledge, skills and abilities required under § 7 (1) of the General Provisions of these exam regulations for the Master's examination process in the subject/discipline of Quantitative Data

Analysis and Data Science. The objective of the Master of Science degree program is to deepen or expand the knowledge acquired in the Bachelor's degree program, thus providing the basis for the development and/or application of the student's own ideas (application or research-oriented); graduates possess a broad, detailed and critical understanding at the cutting edge of knowledge in one or more specialized fields and are able to apply their knowledge and understanding as well as their problem-solving skills in new and unfamiliar situations related to their field of study in a wider or multidisciplinary context (instrumental competencies),

-
- to integrate knowledge and deal with complexity,
- and to make scientifically sound decisions on the basis of incomplete or limited information, taking into account social, scientific and ethical findings resulting from the application of their knowledge and from their decisions,
- to acquire new knowledge and skills independently and to carry out largely self-directed and/or autonomous independent research- or application-oriented projects (systemic competencies)
- to communicate their conclusions and the information and motives underlying them to expert representatives and laypersons in a clear and unambiguous manner, to exchange information, ideas, problems and solutions with both experts and laypersons on a scientific level and to assume prominent responsibility in a team (communicative competencies).

³Further details of the course objectives are set out in the module handbook.

(2) ¹The regular duration of study in the Master's program is set out in § 1 (5) of the General Provisions of these exam regulations. ²A total of 120 credit points must be obtained to successfully complete this Master's degree program. ³The start of the program (winter or summer semester) is set out in the regulations governing admission and enrollment at the University of Tübingen, as amended.

(3) ¹A prerequisite for enrollment in this Master's program is a Bachelor's degree in Data Science or a related subject - particularly Informatics, Mathematics, Physics, Psychology or Economics - with a regular duration of study of six semesters and courses worth 180 credit points, or an equivalent degree, completed with a grade of 2.5 or better, respectively. In particular, these skills in the following areas are required:

- Mathematics: single- and multi-dimensional analysis, linear algebra and either numerics or stochastic processes
- Informatics: Programming, algorithms and data structures

A further requirement for admission to the Master's program is very good English language skills (level C1/B2 CEFR); this must be documented by one of the following:

- German higher education entrance qualification with English as a first or second foreign language up to the final year of school, with a grade of "good" or better.
- TOEFL iBT test with at least 79 points, or a test determined by TS/TOEFL as equivalent and passed with a corresponding number of points
- IELTS test with points of at least 6.5
- Cambridge Certificate in Advanced English (CAE) (B2 or better)
- A recognized higher education degree, conducted entirely in English, of at least three years duration.
- Higher education entrance qualification from the United Kingdom, Ireland, USA, Canada, Australia, New Zealand

²The examination board will decide on the equivalency of a degree and on whether the prerequisite in sentence 1 above has been met. ³The board may transfer this decision revocably to the head of the board. ⁴If there is a set number for admission, the articles may specify that the selection committee formed for the relevant selection process decides instead.

§ 3 Structure

(1) ¹The Master's program is structured over two years. ²It concludes with the Master's examination.

(2) ¹Students complete a program of 120 credit points. Classes and required studies are divided into the following study areas:

- (a) Interdisciplinary Foundations
- (b) Psychometrics and Mathematical Psychology
- (c) Econometrics
- (d) Machine Learning
- (e) Thesis

Study area	Module description	recommended semester (subject to availability and change, see module handbook)	ECTS credits
Foundations	Programming	1-2	3
	Advanced Statistics	1	3
	Master's seminar on Econometrics	2	9
	Experimental and Quasi-Experimental Design	1-2	6
	Research Project	3	9
Psychometrics and Mathematical Psychology	Psychometrics	2	6
	Mathematical Models in Psychology	3	6
	Bayesian Modeling	2	6
	Item Response Theory	2	6
	Latent Variable Modeling	1	6
	Longitudinal Data Analysis	3	6
Econometrics	Applied Econometrics	2	6

	Advanced Time Series Analysis	1	9
	Advanced Microeconometrics	2	9
	Machine Learning in Econometrics	2	6
	Statistics of Financial Markets	1, 3	9
	Empirical Asset Pricing	2	9
	Financial Market Microstructure	2	6
	Financial Economics	1, 3	9
Machine Learning	Machine Learning (1)	1	6
	Data Literacy	1	6
	Deep Learning	1-3	6
	Statistical Machine Learning	2	9
	Probabilistic Machine Learning	2	9
Thesis	Master's thesis incl. lecture	4	30

(3) ¹It is prohibited for students to take, as part of their Master's studies, any module or class which is the same as, or substantially similar to, one they took in their Bachelor's studies; such modules and/or classes may therefore not be selected as part of Master's program studies under these exam regulations, nor be completed under § 3(2). ²In borderline cases and particularly cases in which the content of the modules/ classes overlaps to a large degree, the examination board is to decide on whether the module/ class may be selected/ completed as part of the program. ³The examination board may in individual cases define another appropriate module or class to replace a module or class which is excluded, if otherwise on the basis of these exam regulations and the module handbook there would not be a module yielding the necessary credits for an individual student to complete the program.

II. Teaching of material

§ 4 Types of classes within the modules

¹Classes of the following types in particular may be scheduled:

1. Lectures
2. (project) seminars
3. Colloquiums, exercises, internships / laboratory practical work, tutorials, excursions.

²For classes which are wholly or largely made up of elements of the types listed in item 1 nos. 2-3 above, participant numbers may be limited under § 30(5)(1) LHG if training could not otherwise be guaranteed in accordance with the regulations or if a limitation is necessary for other reasons of research, teaching or patient care. ³Subject-related techniques in particular

are to be taught in these classes along with interdisciplinary, professionally-oriented qualifications. ⁴In addition, students are to have the opportunity to work in small groups to develop the ability to present the knowledge obtained both verbally and in written form. ⁵In addition, within the framework of § 30 (5)(1) LHG the right to participate in classes may be restricted or admission to part of the course may be made dependent on the completion of certain coursework, if training could not otherwise be guaranteed in accordance with the regulations or a limitation is necessary for other reasons of research, teaching or patient care.

§ 5 Languages of instruction and examination

¹English is the language of instruction and examination in this Master's degree program.

²Classes and exams may also take place in German; students are required to be sufficiently competent in English. ³In classes aimed at teaching a language other than German, the teaching and assessment may be conducted in the relevant other language.

§ 6 Types of assessment

The assessed coursework required in each of the modules is set out in the module handbook.

III. Organization of program

§ 7 Volume of material

The required volume of study is set by the General Provisions of the exam regulations, the structure of the program and the modules - particularly § 3 of the Special Provisions of the exam regulations.

IV. Master's examination and overall grade

§ 8 Nature and execution of Master's examination

In addition to the prerequisites set out in the General Provisions of these exam regulations, prerequisites for admission to the Master's thesis process and other possible oral examinations to be completed in the final phase of the program under § 15 of the General Provisions are:

- the successful completion of further modules worth a total of at least 90 ECTS credits (cf. overview in § 3). In exceptional cases, the lacking ECTS credits of one module at most (not counting the Research Project) may be earned in the same period as the Master's Thesis is written in.

§ 9 Master's thesis

Provisions governing the Master's thesis are set out in § 17 of the General Provisions of these exam regulations.

§ 10 Calculation of the overall grade

The overall grade of the Master's examination is calculated on 25% of the grade for the Master's thesis module and 75% of the average (as weighted by credit points) of the grades of the other graded modules, taking account of the further provisions in § 21 of the General Provisions of these exam regulations.

V. Closing remarks

§ 11 Effective date

¹These exam regulations come into effect on the date of their publication in the University of Tübingen's official bulletin, the Amtliche Bekanntmachungen. ²Their first semester of validity is winter semester 2020-21.

Tübingen, 07.02.2020

Professor Dr. Bernd Engler
President