Master of Science (MSc) in Business Administration and Data Science

Preamble

Pursuant to section 45 of Ministerial Order no. 2285 of 1 December 2021 on Full-time Programmes at Universities (the University Programme Order); section 28(3) and section 30(1) of Ministerial Order no. 69 of 26 January 2023 on Admission and Enrolment on Full-time Programmes at Universities (the Admission Order); Ministerial Order no. 2271 of 1 December 2021 on University Examinations and Grading (the Examination Order) and Ministerial Order no. 1125 of 4 July 2022 on the Grading Scale of Educations within the Sphere of the Ministry of Higher Education and Science (the Grading Scale Order) the Dean of Education, acting on a proposal prepared by the study board, has approved the following programme regulations.

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Part 1: Programme specific regulations

Degree title and duration

1. Students who successfully complete the programme earn the degree Master of Science (MSc) in Business Administration and Data Science, in Danish: cand.merc.(datavidenskab). The Latin title is candidatus/candidata mercaturae.

(2) This programme is governed by the Study Board for the BSc and MSc in Business Administration and Information Systems, MSc in Business Administration and Ebusiness, and MSc in Business Administration and Data Science.

(3) The master's (candidatus) programme is a two-year full-time programme, corresponding to 120 ECTS credits. The deadline for completing the programme is the rated time of study + one year after the student commenced the programme. Leave periods, if any, are not included in this time frame. Level of qualification: Master’s degree at NQF/EQF Level 7 referring to Second Cycle in the Bologna QF.

(4) The programme duration refers to the number of student full-time equivalents according to which the programme is structured. A full-time equivalent corresponds to one year of work by a full-time student and corresponds to an annual workload of 1650 working hours corresponding to 60 ECTS credits (European Credit Transfer System). The workload includes scheduled classes, preparation for classes, completion of written assignments, other teaching activities, independent study as well as preparation for, and participation in examinations.

Admission requirements and qualifying degrees

1A. No bachelor degree gives the right to admission to the MSc in Business Administration and Data Science**.**

(2) The following bachelor degrees give access to admission to this programme, see however subsections (4) and (6):

From CBS:

- HA(it.)
- HA(mat.)

From other Danish educational institutions:

- ITU - Bachelor of Science in Software Development
- ITU - Bachelor of Science in Data Science
- KU - Bachelor i datalogi
- RUC - International bachelor in Computer Science
- AU - Bachelor i Computer Science

- AAU - Bacheloruddannelsen i Datavidenskab.

(3) Admission to the MSc in Business Administration and Data Science programme requires that the applicant has completed a qualifying bachelor degree, among these a professional bachelor degree, or other Danish or foreign degree at the same level. During the education the applicant must have covered the following academic disciplines to a sufficient degree on an overall, individual assessment:

The specific entry requirements are minimum 30 ECTS-points within one or more of the following areas:

- Information Technology
- Quantitative Methods
- Economics.

(4) The requirements for language skills are available on CBS' homepage: cbs.dk/graduateadmission.

(5) Standard assessments of a number of degrees from CBS or other universities are available on cbs.dk/graduateadmission.

(6) In the event that there are more applicants who fulfil the admission requirements than there are places offered at this programme, the selection shall be made according to criteria laid down in advance and published on cbs.dk/graduateadmission.

(7) Available at cbs.dk/graduateadmission are the application and admission procedures, including deadlines, as well as information about the date when the offer or the rejection of a place of study is made and about the requirement to accept a place of study.

Purpose

2. Based on the student's knowledge and insights into practices within business data analytics, with a combination of data science, business, and public policy fields, a candidate who has completed MSc in Business Administration and Data Science will be able to accomplish a variety of skills in the domain of business data analytics.

The candidate will be able to perform specialist functions that requires knowledge and skills from the highest international research in data science and business issues, with an ability to box-in complex problems and take forward actions using data-driven decision making to support organizational strategies.

The programs interdisciplinary focus entails that the candidate will be able to develop and communicate scientifically-rooted solutions, based on scientific techniques and methods within the data analytics, business and legal subjects. The students will gain a common master degree, building on the various undergraduate programs; enable them to bring data analytics into the respective areas that they are building on.

Attention has been focused particularly on the candidates mastering the methods, techniques and processes with a high scientific level within design, development, adoption, implementation,

evaluation and exploitation of data science for business IT and economics. Candidates will have the ability to apply theories, frameworks, algorithms, methods, techniques, and tools to analyze, describe, and solve complex and interdisciplinary challenges within both internal and external business data pipelines for organizations.

Throughout the program the candidates will acquire the ability to work in dependently and professionally with well-defined problems and to work effectively on their own using the real-world datasets provided by various industry partners.

Because the candidate is able to analyze various data pipelines with an analytical focus on deriving meaningful facts, actionable insights valuable outcomes, and sustainable impacts to support organizational processes and functions, the candidate acquires prerequisite to enter various professional and enterprise environments and engage themselves with other disciplines in order to solve specific problems using data-driven decision making.

The high professional level of the MSc in Business Administration and Data Science leads to enhancement of candidate's ability with a solid understanding of and ability to aid technical, managerial, and societal aspects of digitalization, to promote a global and local perspective on digital strategies, data pipelines and data-based business models. The candidates will be able to facilitate and integrate data-driven decision making into organizational practices by acquiring, producing, and using new knowledge with data science and within new domain areas.

Competency profile

3. The Study Board has developed a competency profile, which describes the expected learning outcomes of this degree programme. Please see appendix below.

Content and structure

Content

4.The Master of Science (MSc) in Business Administration and Data Science covers the academic disciplines of business, public policy, and data science with a focus on the subfields of data business, data regulation, and data analytics.

(2) The **Data Analytics** discipline (DA-courses, data analytics courses) covers basic and applied research in data science in terms of theories, frameworks, infrastructures, data structures, algorithms, models, methods and tools. The objective of the teaching activities in the data analytics discipline is that the student becomes proficient to design, develop, implement, test and document technical business data analytics solutions for organisations by using data analytics oriented programming languages and environments after graduation. DA-courses will always include real-world business elements in terms of datasets, cases, articles etc.

(3) The **Data Business** discipline (DB-courses, data business courses) covers business models, data economics, innovation and strategy, marketing, project management, and entrepreneurship. The objective of the teaching activities in the data business discipline is that the student acquires skills in innovation, design, planning, implementation, and docu-mentation of data analytics solutions for business purposes, processes and functions. The student must also develop competences for integration of business data analytics in existing organisations. DB-courses will include an active data analytics component in terms of articles, cases, exercises and activities.

(4) The **Data Regulation** discipline (DR-courses, data regulation courses) covers international and national regulations and legislations for different kinds of personal, organizational, and public data. The objective of the teaching activities in the data regulation discipline is that the student develops competences in assessing and designing business data analytics solutions and products in accordance with the applicable legislation, ensure regulatory compliance, reflect on data ethics and if possible, participate in developing legislation. The student must also be able to adapt business data analytics solutions to the relevant organisational and societal policies.

(5) The purpose is to make the student a specialist by creating coherence between prior qualifying education, course activities, project activities, and the final thesis.

Modules

1st semester

(6) *Innovation and Strategy in the Digital Economy (DB-course)*

This course will give students an introduction to central issues of innovation and strategy in the digital economy. It forms the background for the study of data in the business context. The growth of the digital economy is predicting a data rich future and a transformation of the business landscape with implications for existing firm, entrepreneurial ventures, and individual workers. In some of the most dynamic sectors of the modern economy, such as, apps for smartphones, video games, media content, scientific and technical problems solving, companies' overall performance already rely on data, setting requiring a whole new set of skills and organizational capabilities. The course will develop the conceptual foundations, frameworks and methods for analyzing the relationships between communities, crowds, and firms. It introduces student to the process of digital transformation. The course gives students a systematic basis for assessing the economic potential of different sorts of data and organizational imperatives to unlocking that potential. The first part of the course introduces business models of the digital economy. The latter part will focus on organizing in a data rich business context.

(7) *Datafication: Regulation, Governance, Security, Privacy and Ethics (DR-course)*

This course will cover issues in regulation, governance, compliance and responsibility with regard to data in general and business data analytics in particular. Course topics will include but are not limited to Danish, EU and international data policies and personal data protection regulations, cyber security, privacy risks, and ethical conundrums with digital data. The course will also train students to be able to critically reflect on the potential negative impacts of business data analytics for different societal stakeholders.

(8) *Foundations of Data Science: Programming and Linear Algebra (DA-course)*

This course covers foundational topics in programming languages and mathematical foundations for Data Science. Regarding programming, the course introduces Python 3.0 as a programming language for data mining and machine learning, In respect of mathematical foundations, the course introduces the basic concept of linear algebra such as vector spaces, dimensionality, matrices, linear transformations and eigenvalues and so on. In addition to the above, the course also introduces big data architectures and distributed computing techniques employed in data analytics.

(9) *Data Management and Visualization* (DA-course)

In this course, students will gain knowledge about data management tools and methodologies as well as an overview of visual analytics. The course is divided into three areas: 1/ Databases, 2/ Extract, transform and load processes, and 3/ Visualizations and dashboards. The course will give students the ability to design, evaluate and build effective data storage solutions and ETL (extract, transform and load) pipelines. Visualization and visual analytics will be covered from two points of view. First, as a tool for exploratory data analysis and secondly as a way to communicate information to different stakeholders in an organization through effective visualizations as well as interactive dashboards.

2nd semester

(10) *Data Economics (DB-course)*

This course will give students an introduction to the economics of information in general and data in particular with a focus on managerial, organizational and societal implications. Course contents will cover the effects of digitization and digitalization on business processes, products, and services and their economic impacts in terms of business models, pricing options, competitive advantages, and market valuation. It will also cover topics such as customization, personalization, micro-targeting, network externalities, risk assessment etc.

(11) *Machine Learning and Deep Learning (DA-course)*

This course covers topics in machine learning and deep learning. The focus of the course will be on the following:

- Supervised learning approaches include parametric/non-parametric algorithms, support vector machines, kernels, logistic regression, etc.
- Unsupervised learning methods such as clustering, dimensionality reduction, and recommender systems.
- Deep learning methods include Feedforward neural networks, Convolutional (CNN), Recurring Neural Networks (RNN), and so on.

The course will include case studies and applications so that the students will learn how to apply different algorithms to perform data analytics on real-world datasets.

(12) *Natural Language Processing and Text Analytics (DA-course)*

This course will cover topics in and aspects of mining and analysing textual data to discover latent patterns, extract useful information, identify entities, summarize knowledge, and predict class labels with an emphasis on unsupervised and supervised machine learning techniques for natural language processing. The course will first introduce relevant concepts and methods in Linguistics, Mathematics, Probability and then focus on various aspects of text analytics such as Part of Speech Tagging, Parsing, Semantics, Entity Recognition, Sentiment Analysis, Text Classification, and Topic Modelling.

(13) *Predictive Analytics (DA-course)*

In this course, students will gain conceptual knowledge about mathematical foundations, statistical principles and procedural skills for using statistical methods and tools for predictive analytics. The course will enable students to design, develop, and evaluate predictive analytics models combining

business data sets with open, register and big data sets. The course will include topics in and aspects of advanced time-series analysis and econometrics. The students will be also able to reflect upon the costs, benefits and trade-offs between different predictive analytics approaches.

3rd semester

(14) Elective courses can be chosen among electives offered by the MSc programme in Business Administration and Data Science, other programs at CBS, other Danish universities, or universities abroad.

(15) Students can choose electives about analytics, business or policy. The elective courses do not have to combine two different academic disciplines. The curriculum in the electives may not overlap with the compulsory curriculum, and enrolment must be pre-approved by the Study Board.

(16) Internships can be approved as electives for up to 15 ECTS. The Study Board sets specific criteria for the approval of interhips. The criteria are available on the student intranet MyCBS

4th semester

(17) At the fourth semester, students write their Master's Thesis. The thesis needs to be in line with the objectives listed in section 4A.

Structure

(18) The below table lists the structure of the programme and the ECTS credits of the individual courses. The course descriptions are available in the online course catalogue.

Direct links are inserted in the below table.

1st semester

Course	ECTS
Innovation and Strategy in the Digital Economy	7.5
Datafication: Regulation, Governance, Security, Privacy and Ethics	7.5
Foundations of Data Science: Programming and Linear Algebra	7.5
Data Management and Visualization	7.5

2nd semester

Course	ECTS
Data Economics	7.5
Machine Learning and Deep Learning	7.5
Natural Language Processing and Text Analytics	7.5
Predictive Analytics	7.5

3rd semester

Electives/internship (30 ECTS in total), see subsections (14)-(16).

Course	ECTS
Electives/internship	30
Internship	7.5

Course	ECTS
Internship	15

4th semester

Course	ECTS
Master's Thesis	30

Master’s thesis

4A. The master's (candidatus) thesis must document skills in applying scientific theories and methodologies to a clearly defined academic topic. The thesis must be placed at the second year of study of the master’s candidatus programme.

(2) The Programme Director, or the person the Programme Director has empowered to do so, approves the research question of the master’s thesis and at the same time determines a submission deadline for the thesis, see subsection (3), and a plan for the thesis supervision. The deadline for submitting the thesis contract is 15 November in the student’s 3rd semester, by submission of the thesis contract; see however section 14(3). See also section 19(7).

(3) The master's thesis must be submitted in the student’s 4th semester, and it is not possible to withdraw from the exam once the thesis contract has been approved. The deadline for submitting the thesis is 15 May. If the student does not submit within the deadline, the student has used one examination attempt, unless a dispensation has been granted under section 14(7).

(4) If the student does not submit the thesis within the time frame specified in subsection (3), the Programme Director, or the person the Programme Director has empowered to do so, approves a modified problem formulation within the same field and lays down a new three-month deadline for submission at the same time. If the student does not submit the thesis by the new deadline, the student may be granted a third examination attempt, see the Examination Order, in accordance with the same rules which applied to the second examination attempt.

(5) The rules in subsection (4) also apply for a master’s thesis for which the student has not obtained at least the grade 02, see the Grading Scale Order.

(6) The purpose of the Master’s thesis is to develop and assess the student's ability to engage in in-depth studies and independently describe, analyse, and process a complex issue using relevant scientific theories and methods.

(7) The student chooses the topic of the Master’s thesis within the programme profile’s particular academic identity and theoretical field(s). The thesis accounts for 30 ECTS-points.

(8) The Study Board determines the detailed regulations regarding the Master’s thesis including guidance from the study guide as well as hours of individual supervision, please see the studie page on the student intranet.

(9) When working on the Master’s thesis the student is entitled to supervision to a predetermined extent.

Examinations

5. The programme consists of the examinations listed below.The learning objectives and the regulations of the individual examinations are prescribed in the online course catalogue. Direct links to the individual examinations are inserted in the table below.

1st semester

Exam name	Exam form	Gradingscale	Internal/external exam	ECTS
Innovation and Strategy in the Digital Economy	Written sit-in exam on CBS' computers	7-point grading scale	Internal exam	7.5
Datafication: Regulation, Governance, Security, Privacy and Ethics	Oral exam based on written product	7-point grading scale	Internal exam	7.5
Foundations of Data Science: Programming and Linear Algebra	Oral exam based on written product	7-point grading scale	Internal exam	7.5
Data Management and Visualization	Oral exam based on written product	7-point grading scale	External exam	7.5

2nd semester

Exam name	Exam form	Gradingscale	Internal/external exam	ECTS
Data Economics	Home assignment - written product	7-point grading scale	Internal exam	7.5
Machine Learning and Deep Learning	Oral exam based on written product	7-point grading scale	Internal exam	7.5
Natural Language Processing and Text Analytics	Oral exam based on written product	7-point grading scale	External exam	7.5
Predictive Analytics	Home assignment - written product	7-point grading scale	Internal exam	7.5

3th semester

Exam name	Exam form	Gradingscale	Internal/external exam	ECTS
Electives/internship	See individual course descriptions	See individual course descriptions	See individual course descriptions	30

There are two internship options (see also section 4(14)-(16)):

Exam name	Exam form	Gradingscale	Internal/external exam	ECTS
Internship	Home assignment - written product	7-point grading scale	Internal exam	7.5
Internship	Home assignment - written product	7-point grading scale	Internal exam	15

4th semester

Exam name	Exam form	Gradingscale	Internal/external exam	ECTS
Master's Thesis	Oral exam based on written product	7-point grading scale	External exam	30

Prerequisites for registering for the exam – compulsory activities

5A. The following courses have compulsory assignments or other compulsory activities, see section 13. Further specifications and regulations are listed in the relevant course description in the online course catalogue, see the below link(s).

Course	Number of mandatory activities
Foundations of Data Science: Programming and Linear Algebra	2

Course	Number of mandatory activities
Data Management and Visualization	2
Machine Learning and Deep Learning	2
Natural Language Processing and Text Analytics	2
Predictive Analytics	2

Body of external examiners

6. This degree programme is covered by the body of external examiners for the business administration programmes. It is possible to supplement with external examiners from other bodies of external examiners, so that the joint body of external examiners for this programme covers all the academic disciplines of this degree programme.

Pass requirements

7. The general pass requirements are stipulated in section 26.

8.-10. (Not in use.)

Part 2: General regulations for master's (candidatus) programmes

11. The teaching is organised in a collaboration between the Programme Director, the course coordinators and the teachers. The Study Board approves the organisation of the teaching.

Examination language

12. Examinations are conducted in English; see however subsection (2).

(2) If a course has been taught in a language other than English, the examination is conducted in that language.

(3) The Study Board may decide to deviate from the rules stipulated in subsections (1)-(2), except when documenting the student's skills in a specific other language is part of the objective of the examination.

(4) The provisions in subsections (1)-(2) apply to oral and written sit-in examinations and to all types of written take-home assignments (seminar papers, projects etc.) subject to assessment.

Prerequisites for participating in the exam: compulsory activities

13. Besides the examinations listed in section 5, which are included in the final grade point average, on some courses there are one or more compulsory activities. That means that as part of the teaching, one or more written assignments must be submitted and/or one or more oral presentations or other compulsory activities must be carried out. In order for students to participate in the final examination of the course in question, it is a condition that, within a set deadline, the required number of compulsory activities have been submitted/carried out and have been approved by the teacher. What is evaluated is the student's effort; i.e. whether the student has made a try at solving/answering the assignment or has participated in the activity. A blank or irrelevant submission is not regarded as having participated in the activity. Students who do not fulfil the requirements for participating in the examination have used an examination attempt, see section 14(6). Further specifications regarding the number of compulsory activities, format etc. are stated in the course description of the individual course.

(2) A student who, within the deadline determined under subsection (1), is short on having one or more activities approved as regards the required number of approved activities in the course may, to a reasonable extent, be given one or more extra assignments/participate in one or more extra activities, prior to the ordinary examination (1st examination attempt) in the final examination in the course, see however subsection (3). However, it is a precondition that the student has participated in all set activities, unless it can be documented that lack of submission/participation was caused by illness or similar circumstances. If necessary for practical reasons, a different type of activity may be decided.

(3) In courses where the number of set activities during the teaching period is higher than the number of activities that are required to be approved (x number of y number set activities must be approved), the student may not be given extra assignments/participate in extra activities prior to the ordinary examination in the final examination in the course; this also applies in cases of illness or similar circumstances.

(4) A student who, prior to the re-exam (2nd examination attempt) in the final examination in the course, is still short on having one or more activities approved as regards the required number of

approved activities in the course may, to a reasonable extent, be given extra assignments/participate in extra activities prior to the re-take examination. However, it is a precondition that the student has participated in all set activities, unless it can be documented that lack of submission/participation was caused by illness or similar circumstances. Further specifications regarding the number of compulsory activities, format etc. are stated in the course description of the individual course.

(5) For a student who is to participate in a re-exam under programme regulations which are entered into force after the first time the student was registered for the course in question, the student shall not be subject to any new requirements about compulsory activites resulting from the newer programme regulations.

Registration for and withdrawal from courses and exams

14. CBS registers the student for the 60 ECTS comprising the coming year of study, and in addition CBS makes a semestrial registration for the student to any not completed courses from previous years of study.

(2) The students register for electives via the Self Service. Students not registered for mandatory courses and electives for a total of minimum 60 ECTS in a year of study, must register for electives, including summer school courses, corresponding to the lacking ECTS in the coming year of study, resulting in the student being registered for a minimum of 60 ECTS in the coming year of study.

(3) If the registration made under subsection (1) is more than 60 ECTS for the student's second year of study, the student may withdraw from elective courses, so that the student is registered for no more than a total of 60 ECTS, or the student may apply for an individual study plan.

(4) The student can be deregistered from one or more courses or course elements where 1) the students is an elite athlete, or where 2) there are extraordinary circumstances, including impairment, and where the student will be unable to fulfil the registration requirement, or where 3) the student is an entrepreneur, see section 18, or where 4) the student is the chairperson of a voluntary organisation under *Dansk Ungdoms Fællesråd (DUF)* and where the student will be unable to fulfil the registration requirement. Deadlines for submitting dispensation applications are determined on the student intranet.

(5) When selecting students for elective courses, a draw is made among the students who fulfil the conditions for taking the elective course in question if there are more applicants for the course than there are available places. For certain electives the selection is not made by lot, but on the basis of a motivational essay; this will be stated on the list with the offered electives on cbs.dk.

(6) Students are automatically registered for an examination or examinations when they are registered for a course or course element with which one or more examinations are associated. Withdrawal from the ordinary exam (1st examination attempt) is not possible, and students have used an examination attempt, see section 27(1), unless an exemption has been granted pursuant to subsection (7). Students who do not fulfil the requirements for participating in the examination as laid down by the university, see section 13(1), have used an examination attempt, see section 27(1), unless an exemption has been granted pursuant to subsection (7).

(7) The university may grant exemptions from the rules set out in subsection (6) where 1) the students is an elite athlete, or where 2) there are extraordinary circumstances, including impairment, or where 3) the student is an entrepreneur, see section 18, or where 4) the student is the chairperson

of a voluntary organisation under *Dansk Ungdoms Fællesråd (DUF)*, see the University Programme Order. Deadlines for submitting dispensation applications are determined on the student intranet.

(8) When a student has used one or more exam attempts in a mandatory course, the student cannot deregister from the course, see s. 12() of the University Programme Order.

(9) The university may grant an exemption to the rule stipulated in subsection (8) if warranted by extraordinary circumstances. When assessing whether extraordinary circumstances apply, none of these circumstances can be taken into consideration: prolongation of the period of study; academic aptitude; and the student's desires as regards the academic content of the degree programme. In addition, in order for an exemption to be granted, the extraordinary circumstance must be both directly linked to the course in question and, over a longer period of time, be preventing the student from completing the mandatory course.

(10) When a student has used one or more exam attempts in an elective course, the student cannot deregister from the course, see s. 13(1) of the University Programme Order.

(11) The university may grant an exemption to the rule stipulated in subsection (10) if warranted by extraordinary circumstances. When assessing whether extraordinary circumstances apply, none of these circumstances can be taken into consideration: prolongation of the period of study; academic aptitude; and the student's desires as regards the academic content of the degree programme. In addition, in order for an exemption to be granted, the extraordinary circumstance must be both directly linked to the course in question and, over a longer period of time, be preventing the student from completing the elective course.

Re-exams

15. Students are automatically registered for the re-exam (2nd and 3rd examination attempt) when the student has not passed the exam in question. Within a deadline, the student can withdraw from a re-exam (2nd and 3rd examination attempt), see subsection (5). However, it is not possible to withdraw from the 2nd and 3rd examination attempt as regards the master's thesis. If the student has not withdrawn within the deadline, the student has used and examination attempt, see section 27(1).

(2) On programmes with two annual examination periods (semester examinations), students who have not passed an ordinary examination are automatically registered for the re-exam (2nd examination attempt) in the same examination period or immediately thereafter.

(3) On programmes with more examination periods than in subsection (2), students who have not passed an ordinary examination are automatically registered for the re-exam (2nd examination attempt), which will be held as soon as possible; however, no later than six months after the ordinary examination.

(4) The rules on automatic registration for a re-exam (2nd examination attempt) are dispensed with if the student is not offered the opportunity to fulfil the requirements laid down pursuant to section 13(1) and (3) before the second examination attempt is held. The student is registered for the next examination attempt as soon as possible.

(5) The deadline for withdrawal from an examination is 1 month before the start of the examination in question. However, a student who awaits an assessment is exempt from this deadline as regards the re-exam of the course in question.

(6) For the requirements regarding documentation etc. concerning illness during an examination, reference is made to CBS' rules regarding illness in connection with an examination. Attention must be paid to the documentation deadline stated in those rules.

(7) Re-exams are subject to the learning objectives of the ordinary examination of the examination in question.

(8) Re-exams are conducted according to the examination regulations of the ordinary examination of the examination in question, except when:

1. the examination regulations for the examination in question explicitly contain differing provisions for the re-exam, or
2. it is a written examination and the number of registered candidates for the re-exam warrants that it may most appropriately be held as an oral examination.

(9) It is not possible to determine another examination form for the re-exam of the master's thesis.

Study start test

16. The student must pass the study start test in order to continue on the programme. An online-course will be available prior to the study start test, and the student will be able to take the online-course as many times as needed. The purpose of the study start test and the online course is to make the students acquainted with academic integrity and provide them with an introduction to source management and correct referencing. In order to pass the study start test, the student must show that he/she knows the rules on academic conduct.

(2) The study start test is held within the first to 2 months from the beginning of the programme. The study start test is a multiple-choice test, and the student has 2 attempts to pass the exam. The re-take will be held within the first 3 months from the beginning of the programme and is also a multiple-choice test.

(3) The student is automatically registered for the study start test. If the student does not participate in the exam, he/she fails the exam and has used one attempt. If a student fails the study start test, he/she will be able to participate in the re-take. If the student does not participate in the re-take, he/she has used one attempt. If the study start test is not passed after 2 attempts, the university will cancel the student's enrolment.

(4) The university may grant exemptions from subsection (1) and (2) when warranted by extraordinay circumstances.

Extraordinary re-exams and offers of re-assessment/re-exam

17. If an extraordinary re-examination is arranged or offered in accordance with section 30 of the Examination Order (regarding examination irregularities) or the offer of a re-evaluation/re-examination is given in accordance with section 38 or 41 of the Examination Order (regarding complaints about the exam), the re-examination is subject to the learning objectives of the ordinary examination of the examination in question.

(2) Examinations under subsection 1 can be conducted in accordance with the regulations of the re-exam if the examination is an offer of an extraordinary re-exam.

Entrepreneurs

18. Students who are entrepreneurs in parallel with their studies must document that they are either self-employed with a turnover and productive assets or are part of an entrepreneurial environment, e.g. university incubators and regional growth environments, cf. section 14 (2) of the University Programme Order.

(2) A student who has a registered CVR number in a start-up company with relevance for the student's studies or is able to document that he/she has been enrolled in one of the programmes which are offered by Copenhagen School of Entrepreneurship (CSE) or the like is considered an entrepreneur under subsection (1). The student must follow the registered entrepreneurship programme in accordance with the continuous requirements of the programme.

Examination forms

19. Examinations are organised as individual examinations or as group examinations. The specific examination form of a given examination, including whether it is an individual or a group examination, or a mixture of the two, is stated in the relevant course description, see links in section 5.

(2) At both individual and group examinations the student's individual performance must be assessed, and grading must be individual, see subsections (3)-(4).

(3) At oral group examinations the individual student must be examined in such a way that it is ensured that the student's individual performance is assessed.

(4) If a written product is produced by more than one student, and if there is no oral defence of the product, it must be stated in the group product which parts of the product the individual student has written, so that individual assessments can be made of the individual students' performances. It must be stated both in the table of contents and at the introduction of the parts of the product which the individual student is responsible for. The individual student's student number is to be noted, not the student's name. The introduction, the problem statement, methodology sections, and the conclusion – including any subconclusions – can be written jointly. If it within the given exam format makes sense to write other relevant sub-elements of the assignment jointly, it must be described in the exam regulations in the course description for the course.

(5) For group examinations, see subsection (1), rules about those of the following factors that are relevant for the examination form in question must be stated in the regulations of the individual examination:

1. maximum group size
2. the allotted time at the oral examination – see subsection (3)
3. requirements regarding individual contributions – see subsection (4).

(6) Where it is stipulated in the regulations of a given examination that it is a group examination, it is stated in the course description if the students can choose to take the examination as an individual examination instead, see however subsection (7). When the examination in question contains both a written and an oral part, both parts must then be taken as an individual examination.

(7) The student can choose to write the master's thesis individually. When the master's thesis has been made by a group, the student can choose to have an individual oral exam.

(8) When it is an oral exam based on a written product, the following applies to all variations:

1. Submission of the written product is a requirement to be able to attend the oral examination.
2. Both the written product and the oral presentation count in the assessment.
3. The assessment is an overall evaluation of the written product and the oral presentation.

(9) If the written element is of a limited extent and only serves as a basis for a broader oral examination in the syllabus (e.g. as at an oral exam based on a synopsis) it will usually be the oral element that constitutes the central basis of the evaluation. The written element will usually only have a marginal effect on the grade.

(10) If the written element clearly constitutes a greater part of the effort, and is therefore the element most central in achieving the learning objectives for this exam (e.g. as a final written exam with oral defense), it will usually be this element that constitutes the central basis of the evaluation. The oral element will usually only have a marginal effect on the grade.

Examination rules

20. All students have an obligation to familiarise themselves with and to observe the examination rules of the examinations which they participate in, including the general rules that apply to the individual examination. Those rules are in particular:

- The examination rules, as stipulated in the relevant course description, see links in section 5.
- *Rules about written sit-in examinations at CBS, including rules about electronic aids*, see section 21(3).
- *Rules about online oral exams*
- Rules on good academic conduct, see section 4 of *Copenhagen Business School's rules and regulations on academic conduct, including penalties*.

(2) Audio and video recordings of an examination or of the examiners' discussion of a student's performance are not allowed, unless such recordings are considered an integral part of the examination process. Such recordings will then be made by CBS.

(3) It is stipulated in the examination regulations of the individual examination what the maximum number of pages is for a given written product. This pertains to the examination forms written home assignment and oral exam based on a written product. In addition, the following applies for the written product with these two examination forms:

1. In the page count the front page, the bibliography and any appendices are not included. Appendices are not part of the assessment.
2. All pages must have a margin of min. 3 cm in top and bottom and min. 2 cm to each of the sides. The font must be minimum 11 points.
3. The table of contents, tables, diagrams, illustrations etc. are not included in the number of characters, but will not justify exceeding the maximum number of pages.
4. On average, one page must not contain more than 2,275 characters (including spaces).

(4) Upon digital submission the student declares that the submitted product complies with the rules for good academic conduct, form requirements and maximum size, via a digital declaration of authorship.

(5) Any violation of rules and regulations under subsections (1)-(2) will be sanctioned in accordance with *Copenhagen Business School's rules and regulations on academic conduct, including penalties.*

(6) Violation of form or layout requirements stipulated in subsection (3)-(4) or form requirements laid down under section 19(4) may result in a rejection of the exam paper, see section 22 of the Examination Order. If the exam paper is rejected, it will not be assessed, and the student will have used an exam attempt.

Examination aids

21. The examination aids that students are allowed to bring with them to written sit-in examinations are specified in the examination regulations of the individual examination/course.

(2) Unless otherwise stated in the examination regulations, see subsection (1), no examination aids, whether written or technical, are allowed in the examination room, except simple writing and drawing utensils.

(3) In cases where the examination regulations, see subsection (1), stipulate that electronic aids can be brought to the examination room, the provisions stipulated in *Rules about written sit-in examinations at CBS, including rules about electronic aids* apply.

Examinations under special circumstances

22. The Study Board may decide to deviate from the examination regulations stipulated for the individual examination with the purpose of allowing students with special needs to sit examinations under special circumstances. Such exemption can be granted to students who are physically or mentally disabled, to students whose mother tongue is not Danish, and to students who have similar difficulties when this is considered necessary in order to place them on even terms with their fellow students in the examination situation. It is a condition that it does not change the academic level of the examination.

(2) When it is stipulated in the objectives of the examination in question that the student's spelling and writing skills are included in the assessment, the Study Board may grant exemption from this to a student who is able to document a relevant and specific impairment.

(3) Students who wish to apply for permission to sit an exam under special circumstances according to subsection (1) or apply for an exemption according to subsection (2) must submit an application via dispensation.cbs.dk. no later than 2 months before the exam is to take place.

Conducting virtual examinations and examinations abroad

23. The university may conduct oral exams as virtual examinations.

(2) The Programme Director decides, when warranted by special extraordinary circumstances, whether - an oral exam can be conducted as an online oral exam.

(3) When an examination is conducted as a virtual exam CBS' rules about online oral exams apply.

23a. The university may conduct examinations at a Danish representation or at other locations abroad, provided the reason for doing so is that the student is unable to participate in the university's examinations in Denmark for practical or financial reasons and if the student and the exam location

reach an appropriate agreement. Danish examinations held abroad must comply with all the other rules laid down in the Examination Order.

(2) The Programme Director decides whether the examination can be conducted abroad and appoints or approves persons to organise the practical aspects of conducting the examination abroad.

(3) The university defrays the special costs associated with conducting examinations abroad.

(4) The Ministerial Order on Payment for the Services of Civil Servants Serving Abroad (Bekendtgørelse om betaling for tjenestehandlinger i udenrigstjenesten) applies to conducting examinations at Danish representations abroad.

(5) The university may ask the student to pay part or all of the costs incurred by the university to conduct the examination abroad. However, it is a condition that the student confirms in writing in advance his or her willingness to pay the costs in question, on the basis of an estimate made by the university of the expected costs. The university may make it a condition for conducting the examination that the amount is paid in advance.

(6) When an examination is conducted abroad, the conditions and regulations in CBS' guidelines for examinations conducted abroad apply.

Assessment

24. Examinations are either internal or external:

- Internal examinations are assessed by one or more teachers (internal examiners) appointed by CBS from among the teachers at the university or from other universities that offer the same or similar study programmes.
- External examinations are assessed by one or more internal examiners and one external examiner (in Danish: censor) appointed by the Danish Agency for Higher Education and Science.

(2) It is stipulated in the exam regulations of the individual examination whether it is an internal or an external examination, see link in section 5.

(3) Assessment of the examinations is carried out in accordance with the Grading Scale Order.

(4) Compulsory assignments and class participation, see section 13, are assessed by the teacher(s) of the specific course. The assessment type 'Approved/Not approved' is used.

Announcement of results

25. In connection with examinations where the result is not announced immediately after the examination, the result must be announced within 4 weeks after the examination has been held, see however subsection (2). The month of July is not included in the calculation of these 4 weeks.

(2) In connection with bachelor projects, master's (candidatus) theses and master's projects, the result must be announced no later than 6 weeks after the project/thesis has been submitted.

(3) When special circumstances warrant it, the Programme Director can set aside the deadlines stipulated in subsections (1) and (2). If the assessment cannot be completed by the fixed deadline,

the student(s) must be notified as soon as possible and be informed about the reason for the delay and when the result will be announced.

Pass requirements

26. Each examination must be passed separately. An examination shall be passed when the student achieves a grade of at least 02 or the assessment ‘Pass’.

(2) Each examination can be retaken separately. However, passed examinations cannot be retaken.

(3) If a grade consists of several partial grades for various categories of performance (partial examinations), the grade shall be the average of the partial grades, rounded off to the nearest grade on the grading scale, see however subsection (4). The grade shall be rounded up if the average is half-way between two grades.

(4) If the partial grades are given different weights when the combined grade is to be calculated, this is stipulated in the exam overview in section 5. If so, the grade shall be the sum of the individual grades, each multiplied by the weighting of the grade, divided by the sum of the weightings and then rounded off to the nearest grade on the grading scale. The grade shall be rounded up if the average is half-way between two grades.

(5) If an examination consists of partial examinations, each partial examination can be retaken separately. However, passed partial examinations and not-passed partial examinations that are part of a passed examination cannot be retaken.

(6) Any requirements about a certain grade on the grading scale being required as achieved in one or more partial examinations are stipulated in section7.

(7) If an elective course has partial exams, the pass requirements for the specific elective course apply.

(8) The calculation of the overall grade point average is based on the weights of the individual grades, which are listed in the table in section 5.

(9) If a student retakes an examination or another type of assessment, the highest grade applies – see however section 42 of the Examination Order.

27. Students have a maximum of three attempts in passing each examination, see however subsection (2). The Study Board may grant more attempts, if warranted by extraordinary circumstances. The question of academic aptitude may not be included when assessing whether extraordinary circumstances apply.

(2) No later than 16 months after the end of the teaching of the course, the student must participate in the third examination attempt if the course is no longer offered. If the course is offered each semester, the deadline for completing the course is 10 months after the end of the teaching of the course.

(3) Students who are to have their class participation assessed a second time may require an examination instead. However, where class participation includes practical exercises, it cannot be replaced by an examination.

Diploma

28. CBS issues a diploma to students who have completed their study programme, in accordance with the requirements stipulated in section 51 of the Examination Order. The diploma is issued to the graduate no later than 2 months after the announcement of the result of the final examination. July is not included in the calculation of these 2 months.

(2) Students who leave the programme without having completed it are entitled to receive a transcript documenting the completed parts of the programme, with the relevant number of ECTS credits stated.

Leave

29. A student may be granted leave from the programme on personal grounds. The specific rules for obtaining leave and the provisions that apply to students while on leave are stipulated in CBS' *Rules regarding leave on bachelor and master programmes at CBS*.

Programme regulations

30. The programme regulations and various regulations etc. referred to in this document are publicly available on CBS' website, more specifically on studieordninger.cbs.dk and in the study administrative rules (SAR).

Exemption from the programme regulations

31. The university may, when warranted by extraordinary circumstances, grant exemptions from those rules in the programme regulations which are solely laid down by the university.

(2) An exemption from the programme regulations that requires an exemption from a ministerial order may be brought before the Danish Agency for Higher Education and Science.

Credit transfer

32. Programme elements passed at another university are regarded as equivalent to corresponding programme elements covered by these programme regulations.

(2) The Study Board may grant approval for students to substitute passed programme elements from another Danish or foreign programme of the same level, for programme elements covered by these regulations.

(3) Decisions under subsections (1) and (2) are made on the basis of a professional assessment.

33. Students who, as part of their studies, wish to complete programme elements at another university or another institution of higher education in Denmark or abroad may apply to their home university for pre-approved credit transfer for planned programme elements.

(2) Approval of pre-approved credit transfer pursuant to subsection (1) may only be granted if, in connection with the application for preapproved credit transfer, the student undertakes to submit to the home university the necessary documentation to show whether the programme elements have been passed or failed upon completion of the programme elements for which pre-approved credit transfer has been granted. Students must also consent to the home university requesting the

necessary information from the host institution if students are unable to procure the documentation themselves.

(3) Once documentation is available that the student has passed the programme elements for which pre-approved credit transfer has been granted, the home university administratively approves the transfer of the credit to the relevant programme at the university.

(4) In cases where the programme elements for which pre-approved credit transfer has been granted are, for example, not offered by the host institution, the university may, upon the student's request, change the approval of pre-approved credit transfer pursuant to subsection (1). The student is responsible for and is obliged to take the initiative to compose a proposal for a study plan. The university offers academic support if requested by the student. In special cases, the chair of the Study Board may approve changes to the Study Board’s decisions about pre-approved credit transfer.

(5) Decisions under subsections (1) and (4) are made on the basis of a professional assessment.

(6) Credit transfer of Master theses is not possible when the thesis is the basis of the awarding of a different title in another Master programme.

34. Programme elements which students wish to have transferred from other programmes will be transferred on the basis of the normalised workload specified in ECTS points and stipulated in the relevant degree regulations. Due to the structure of the programme, discrepancies may occur between the equivalent number of ECTS credits and the actual amount of ECTS transferred, as the number of ECTS credits for the programme must total the number of ECTS credits stated in section 1(1).

(2) If the programme element in question is assessed according to the 7-point grading scale or the 13-point grading scale at the academic institution at which the examination was taken, and if this programme element equates or replaces a programme element which according to the exam regulations of these study regulations is assessed according to the 7-point scale or the 13-point scale, the grade will be transferable, but converted into the 7-point scale if assessed according to the 13-point scale. In all other cases, the assessment will be transferred as ‘Pass’. Examinations transferred as ‘Pass’ are not included in the calculation of the final grade point average.

35. Applications for pre-approval or credit transfer must be sent to the Study Board via credit.cbs.dk. See guidance on credit transfer applications on the student intranet.

(2) Concerning complaints about credit transfer decisions, see part 3.

Part 3: Complaints

Complaints about examinations etc.

36. A student is entitled to file a complaint about an examination or other assessment. Concerning the specific rules and procedures, including deadlines, for filing written and reasoned complaints reference is made to the rules in part 9 of the Examination Order and to CBS' guidelines on CBS' student intranet.

Complaints about decisions concerning credit transfer

37. Complaints about decisions made by the Study Board on whether education qualifications acquired at another Danish University may replace parts of the programme (credit transfer) as well as complaints about the decisions made by the Study Board on whether Danish or foreign education qualifications, not yet passed, may replace parts of the programme (pre-approval of credit transfer), may be brought before the Appeals Board for decisions on credit transfer, see Ministerial Order no. 826 of 16 Juner 2023 on credit transfer in university study programmes (meritbekendtgørelsen).

(2) The deadline for filing a complaint is 2 weeks from the date when the complainant was informed of the decision. The complaint must be addressed to the Appeals Board for decisions on credit transfer but sent to the President of CBS; the reasoned complaint should be sent to CBS Legal, Solbjerg Plads 3, 2000 Frederiksberg. It is also possible to send the complaint to: legal@cbs.dk. CBS has the option to process the application again. If the decision is upheld, CBS will forward the complaint to the Appeals Board, accompanied by a statement. CBS will give the complainant the opportunity to comment on the statement within a time limit of 1 week. The complainant's comments, if any, will be enclosed when the complaint is forwarded to the Appeals Board. The Appeals Board will make the final administrative decision.

38. Complaints about decisions made by the Study Board on whether education qualifications acquired abroad may replace parts of the programme (credit transfer) may be brought before the Qualifications Board, see Assessment of Foreign Qualifications etc. Act.

(2) The deadline for filing a complaint is 4 weeks from the date when the complainant was informed of the decision. The complaint must be addressed to the Appeals Board for decisions on credit transfer but sent to the President of CBS; the reasoned complaint should be sent to CBS Legal, Solbjerg Plads 3, 2000 Frederiksberg. It is also possible to send the complaint to: legal@cbs.dk. CBS has the option to process the application again. If the decision is upheld, CBS will forward the complaint to the Qualifications Board, accompanied by a statement. CBS will give the complainant the opportunity to comment on the statement, within a time limit of 1 week. The complainant's comments, if any, will be enclosed when the complaint is forwarded to the Qualifications Board. The Qualifications Board will make the final administrative decision.

Complaints about other decisions

39. Complaints about decisions made by the Study Board or the Programme Director according to these programme regulations have to be filed with the President of CBS. The deadline for filing a complaint is 2 weeks from the date when the complainant was informed of the decision.

(2) A decision made by CBS according to subsection (1) may be appealed by the complainant to the Danish Agency for Higher Education and Science when the complaint is concerned with an error of law or procedure. The deadline for lodging an appeal is 2 weeks from the date when the

complainant was informed of the decision. The reasoned appeal should be addressed to the agency but sent to CBS Legal, Solbjerg Plads 3, 2000 Frederiksberg. It is also possible to send the complaint to: legal@cbs.dk. CBS will forward the appeal to the agency, accompanied by a statement. CBS will give the complainant the opportunity to comment on the statement, with a time limit of at least 1 week. The complainant's comments, if any, will be enclosed with the other case files when the appeal is forwarded to the agency.

(3) Moreover, students are referred to CBS' Guidelines regarding students' right to file a complaint about decisions made by study boards, programme directors and programme administration.

Complaints about the teaching etc.

40. Complaints about the teaching, academic supervision or other issues concerning the organisation of the degree programme can be brought before the Study Board.

Commencement and transition regulations

41. These Programme Regulations are effective for students enrolled in the programme in September 2023 or later, and for students who are transferred to these Programme Regulations, see section 42.

(2) The 2022 Programme Regulations are repealed as of 1 September 2023.

42. Students who began their studies under the 2022 Programme Regulations or according to transition regulations were transferred to the September 2022 regulations, are transferred to these 2023 Programme Regulations, so that these Programme Regulations are effective for the remainder of the programme, see however (2)-(3).

(2) Students covered by subsection (1) who have not completed the course 'Data Mining, Machine Learning and Deep Learning' shall instead pass the exam 'Machine Learning and Deep Learning'.

(3) Students covered by subsection (1) who have not completed the course 'Visual Analytics' shall instead pass the exam 'Data Management and Visualization '.

Appendix

Competency Profile for Master of Science in Business Administration and Data Science (in Danish: cand.merc.(datavidenskab))

The Data Science program is a research-based, full-time graduate-level program with a diversity of learning activities in the blended learning format (lectures, in-class exercises, mandatory assignments, tool-training workshops, individual and group projects, internships, etc.). We emphasize socio-technical interactions with other students, real-world business datasets from companies, and research-based and Open Source tools and throughout the program. The candidates from the Master of Science in Business Administration and Data Science have had good job opportunities as, for example, Data Scientists, business analysts, big data analysts, data science specialists, data science consultants, business analysis architects, data compliance architects, and data entrepreneurs. Upon completion of this programme, the students will have gained the following competencies.

- a high scientific level competency within the design, development, adoption, implementation, evaluation, and exploitation of data science for business IT and economics (architectures and infrastructures for business data analytics, visual analytics, text analytics, predictive analytics, data stewardship, data management, data compliance, data regulation, data security, data privacy, and data ethics)

- the ability to apply theories, frameworks, algorithms, methods, techniques, and tools to analyze, describe, and solve complex and interdisciplinary challenges within the design, development, adoption, implementation, and exploitation of both internal and external business data pipelines for organizations

- analyze various data pipelines with an analytical focus on deriving meaningful facts, actionable insights, valuable outcomes, and sustainable impacts to support organizational processes and functions.
- a solid understanding of and ability to aid technical, managerial, and societal aspects of digitalization
- a global and local perspective on digital strategies, data pipelines, and data-based business models
- IT-enabled methods, techniques, and tools to support data-driven organizational decision making
- facilitate and integrate data-driven decision-making into organizational practices
- the ability to acquire, produce, and use new knowledge with data science and within new domain areas
- a comprehensive analytical and conceptual set of competencies in Data Science in accordance with normal academic skills
- conceptualize data-driven architectures and data-driven decision-making to support organizational strategies
- innovative capacity and capability to independently reflect and take suitable action
- oral and written communication and technical documentation
- the ability to work independently and in teams including interdisciplinary groups
- the ability to work with people with diverse professional and academic competences
- the ability to work in local, national, and international environments
- the ability to box in complex problems and take forward actions in situations with the uncertainty of outcome or data in-completeness