

Study Regulations Governing the Bachelor's Degree Programme 'Data Science and Artificial Intelligence'

25 April 2019

Note: This translation is provided for information purposes only. In the event of any discrepancy between the translation and the original German version published in the Official Bulletin (*Dienstblatt der Hochschulen des Saarlandes*), the provisions of the latter shall take precedence.

Pursuant to the Saarland Higher Education Institutions Act (Official Gazette of Saarland, p. 1080) and to the Joint Examination Regulations for Bachelor's and Master's Degree Programmes of the Faculty of Mathematics and Computer Science of 2 July 2015 (Official Bulletin No. 72, p. 616) and with the consent of the Saarland University Senate, the Faculty of Mathematics and Computer Science at Saarland University hereby issues the following Study Regulations Governing the Bachelor's Degree Programme in Data Science and Artificial Intelligence.

Section 1 Scope

These study regulations, which govern the contents and structure of the Bachelor's degree programme in Data Science and Artificial Intelligence, are based on the Joint Examination Regulations for Bachelor's and Master's Degree Programmes of the Faculty of Mathematics and Computer Science from 2 July 2015 (Official Bulletin No. 72, p. 616) and the Subject-Specific Regulations Governing the Bachelor's and Master's Degree Programmes in Data Science and Artificial Intelligence of 20 March 2019 (Official Bulletin No. 56, p. 589). The Faculty of Mathematics and Computer Science is responsible for organizing the teaching, study curriculum and examinations associated with this programme.

Section 2 Objectives of the degree programme and career relevance

- (1) The Bachelor's degree programme leads to an initial academic qualification with students on the programme acquiring the basic scientific concepts, knowledge and skills that are relevant in the areas of data science, artificial intelligence, machine learning and big data. To meet these objectives, students are provided with a solid grounding in the mathematical foundations of the field, particularly statistics, and the key underlying concepts and techniques in computer science. Students on this Bachelor's degree programme receive targeted instruction in methodologies drawn from a number of disciplines that enable them to analyse data, automate processes and to design and engineer the models that make autonomous systems possible. Another core element of the Bachelor's degree programme in Data Science and Artificial Intelligence is that students learn the fundamentals associated with a particular field of application and are able to apply the basic theoretical knowledge that they have acquired in data analysis and automation to problems of practical relevance in the field of interest. Students on the programme also address and analyse ethical questions and the fundamental legal aspects of data security and privacy pertinent to their areas of study. A further important aspect of the Bachelor's degree programme is its aim to strengthen appropriate career skills, such as effective communication, teamwork and the ability to independently acquire an understanding of new topics.
- (2) The academic training that students acquire on the B.Sc. Programme 'Data Science and Artificial Intelligence' provides a sufficiently solid foundation for Master's degree

programmes in this and related disciplines.

Section 3 **Start and duration and duration of programme**

- (1) Students can begin the programme at the beginning of the winter or summer semester of each year.
- (2) The curriculum is organized such that the programme can be completed in six semesters (standard period of study).

Section 4 **Types of academic instruction**

The curriculum content is taught using the following types of academic instruction:

1. Lectures ('L', standard class size = 100): Lectures serve to introduce a particular subject area and also provide an overview of the relevant theoretical concepts and principles, methodologies and skills, technologies and practical implementations that are common to the subject. Lecture courses provide suggestions for further reading on a topic and open the way to acquiring a deeper understanding of an area through subsequent exercise and problem-solving classes, practical skills classes and self-directed study.
2. Exercise and problem-solving classes ('EP', standard class size = 20): Exercise and problem-solving classes are small-group sessions used primarily to supplement and reinforce what was learned in the lectures. Students work on representative problems as this provides an opportunity for them to apply and deepen the knowledge they acquired in the lectures, to assess their personal understanding of a specific area and to clarify any questions that they may have.
3. Seminars ('S', standard class size = 15): Seminars provide an opportunity for students to broaden the knowledge and skills they have already acquired and to gain a deeper understanding of a particular field of research through discussions, presentations or seminar assignments based on their study of the specialist literature and relevant academic sources. They also help students acquire the skills necessary for the effective oral and visual presentation of scientific and academic content and encourage students to engage in critical analysis and discussion of research results. A seminar may also include project-related work in areas of current scientific interest or debate. The deeper understanding of a particular field that students acquire through project-related work in the Master's seminar may provide the basis for their final-year Master's thesis.
4. Project seminars broaden and deepen the theoretical knowledge acquired in the areas data science, artificial intelligence and machine learning. During a project seminar, students aim to address and solve a concrete problem in their chosen field of application. Ideally, each problem is overseen by two supervisors, one from the field of data science and artificial intelligence and, when possible, one from the student's chosen field of application.
5. Practical skills classes and project work ('P', standard class size = 15): Practical skills classes or projects offer a number of practical, subject-related topics that introduce students to the specific approaches and methods used in a particular discipline or field of study. The necessary theoretical knowledge underlying a specific topic is acquired by attending lectures and studying the relevant scientific literature. An additional goal

of the practical skills classes is to provide students with the opportunity to gain practical experience with computer-aided methods. Projects tend to address interdisciplinary topics. Working on a topic offers students the opportunity to work in supervised groups to tackle specific assignments from the initial solution design concept through to its final practical implementation. Students learn about the relationships between theory and practice not only through their own independent study and research, but also through project-based teamwork. Participation in a particular practical skills class or project may be dependent on a student having first successfully completed a required course of lectures and exercise and problem-solving classes.

Section 5

Structure and content of the programme

- (1) To graduate from the Bachelor's programme in Data Science and Artificial Intelligence, students are required to earn a total of 180 credits as defined by the European Credit Transfer System (ECTS). Of these, at least 153 credits shall be from graded assessments or assignments. As a rule, students are required to earn 30 credits per semester.
- (2) The degree programme covers modules associated with the areas listed below. Appendix A provides details of the modules and module elements offered in the different areas ('categories') of the programme, the type of academic instruction used, the number of credit hours per week and the ECTS credits earned, the module frequency, the type of academic assessment and whether the module is graded.
 1. 2 ungraded credits from the general lecture series (mandatory)
 2. 27 graded credits from the area 'Fundamentals of Mathematics' (mandatory):
 - a) Mathematics for Students of Computer Science 1 (9 credits)
 - b) Mathematics for Students of Computer Science 2 (9 credits)
 - c) Mathematics for Students of Computer Science 3 (9 credits)
 3. 39 graded credits from the area 'Fundamentals of Computer Science' (mandatory)
 - a) Programming 1 (9 credits)
 - b) Programming 2 (9 credits)
 - c) Fundamentals of Theoretical Computer Science (9 credits)
 - d) Fundamentals of Algorithms and Data Structures (6 credits)
 - e) Big Data Engineering (formerly: Information Systems) (6 credits)
 4. 21 graded credits from the specialist mandatory area (mandatory):
 - a) Elements of Data Science and Artificial Intelligence (9 credits)
 - b) Statistics Lab (6 credits)
 - c) Elements of Machine Learning (6 credits)
 5. 18 graded credits from the core lecture courses in Data Science and Artificial Intelligence (DSAI) (each worth 9 credits; mandatory elective)
 6. At least 12 and at most 18 graded credits from the advanced lecture courses on

DSAI (number of credits earned depends on course; mandatory elective)

7. 7 graded credits from the DSAI seminars (each worth 7 credits; mandatory elective)
 8. 16 credits from modules in the chosen field of application, of which at least 8 credits must be from graded assessments/assignments.
 9. 9 ungraded credits from the Data Science and Artificial Intelligence project seminar (9 credits; mandatory elective)
 10. 9 graded credits from the 'Bachelor's Seminar' module
 11. 12 graded credits from the 'Bachelor's Thesis' module
 12. At least 8 ungraded credits from freely selectable modules in the following areas (mandatory elective section):
 - a) Freely selectable modules from the Bachelor's degree 'Data Science and Artificial Intelligence' or the Bachelor's degree 'Computer Science'
 - b) Modules or module elements from the chosen field of application (if the minimum required number of credits in the chosen field of application as specified in paragraph 2, item 8 is exceeded, the excess credits from ungraded assessments or examinations may be used to meet the requirements of paragraph 2, item 12).
 - c) Tutoring and supervising undergraduate students in exercise and problem-solving classes (usually 4 credits). Tutoring several groups of students is permitted, provided that the exercise and problem-solving classes are from different modules.
 - d) Language courses (maximum of 6 credits; modern languages only and not the student's native language).
 - e) Soft Skills Seminar
 - f) Work placement or internship in industry (maximum of 6 credits) for which an application was submitted to and approved by the Examination Board.
 - g) Modules or module elements for which an application was submitted to and approved by the Examination Board. Students may, for example, submit an application to the Examination Board requesting recognition of certain student activities (particularly university-related administrative activities) or of attendance at courses teaching key skills (maximum of 3 credits in each case).
- (3) To fulfil the requirements of the mandatory section, students must complete all of the modules specified in section 5(2), items 1 to 4 above. Students can select either entire modules or individual module elements from the mandatory electives offered.
- (4) Students are required to accumulate a total of 110 credits in the mandatory section (of which 12 credits are from the 'Bachelor's Thesis' module and 9 credits are from the 'Bachelor's Seminar') and at least 54 credits in the mandatory electives section of the main subject area (not including the chosen field of application). Depending on which field of application is chosen, the 16 credits that students need to acquire in this area may include credits from mandatory courses.

- (5) The number of places available in the 'Project Seminar' and the mandatory elective modules 'DSAI Seminar', 'Tutoring', 'Soft Skills Seminar' and 'Language Courses' are limited. Admission to these modules is managed by the module coordinator.
- (6) Academic credits are either graded or ungraded. A graded academic assessment or examination cannot be split into ungraded and graded credits.
- (7) If a student fails an assessment or examination for a module from section 5(2), items 2–4 at the first scheduled attempt, the student shall be permitted to retake the assessment or examination on one further occasion within the same examination or assessment period provided that the module completion deadline has not expired (cf. section 13(4) of the Examination Regulations). In such cases, the first failed attempt shall be treated as if it had not occurred (cf. provisions governing the '*Freiversuch*' option in section 17(4) of the Examination Regulations). The completion deadline for the modules specified in section 5(2), items 2–4 is the end of the sixth semester.
- (8) A student who received academic credits for successfully completing a module from section 5(2), items 2–4 or from the core lecture courses 'DSAI' and 'Computer Science', is permitted to retake the assessment or examination on one further occasion within the same examination period and during the standard period of study in order to improve the grade awarded (cf. section 13(4) of the Examination Regulations). A student who received academic credits for successfully completing a module in a DSAI advanced lecture course is permitted to retake the assessment or examination on one further occasion within the same examination period in order to improve the grade awarded, provided that the lecturer gave notice at the beginning of the course that the final examination or assessment may be repeated for this purpose. The student will be awarded the higher of the two grades achieved. In all other cases, students are not permitted to repeat an assessment or examination for which they have already achieved at least the minimum passing grade.
- (9) The modules in the mandatory areas 'Fundamentals of Mathematics' and 'Fundamentals of Computer Science' and in the specialist mandatory area are offered at least once a year. The modules in the DSAI core lecture courses in the mandatory electives section of the programme are offered at least once every two years. The DSAI advanced lecture courses will not necessarily be repeated. The Dean of Studies will ensure that a sufficient number of modules are offered each academic year.
- (10) The language of instruction used in the modules in the mandatory areas 'Fundamentals of Mathematics' and 'Fundamentals of Computer Science' is German or English. For modules in the specialist mandatory area and for mandatory elective modules, the language of instruction is English. The language of instruction will be announced at the beginning of the module or module element.
- (11) The modules offered as mandatory electives may be modified, though any such change shall require the approval of the Examination Board. New or modified modules or module elements, their weighting in ECTS credits and their classification within the different sections of the programme will be announced before the semester begins.
- (12) As the maximum number of places in a particular field of application may be limited, students may find that the fields of application available for selection has been restricted. The number of places available in each field of application and the allocation procedures to be applied shall be determined by the Examination Board in consultation with the relevant module coordinators and this information will be made available in suitable form.

- (13) Detailed information regarding the content of modules and module elements are described in the module catalogue that will be made available in suitable form. Any changes or amendments to the information in the module catalogue that are not covered by the provisions of these regulations shall be reported to the Dean of Studies and documented appropriately.
- (14) Course attendance may be compulsory for certain seminars, exercise or problem-solving classes and practical skills classes. Students will be notified of this by the instructor at the beginning of the course.

Section 6 Study plan

The Dean of Studies will compile a study plan based on these study regulations that includes details of the types and scope of the module elements offered (Appendix A) with recommendations on how students can organize and structure their studies efficiently (Appendix B). The study plan will be made available in suitable form. The range of modules offered in a particular semester will be published in the Saarland University course catalogue for that semester.

Section 7 Student advisory services

- (1) The Central Student Advisory Service (*Zentrale Studienberatung*) at Saarland University provides counselling and guidance to prospective students and enrolled students concerning the content, structure and requirements of academic study at Saarland University. It also can advise and assist students with respect to their study options as well as with planning and organizing their studies.
- (2) Questions concerning curricular demands, learning objectives, admission requirements and study planning and organization can be addressed to the departmental academic adviser for the Data Science and Artificial Intelligence programme.
- (3) Questions specific to individual modules should be addressed to the respective module coordinators.

Section 8 Studying abroad

Students have the opportunity to spend part of the programme studying abroad. The study abroad period should be taken after the student has completed the mandatory programme components. Students interested in studying abroad should attend a study-abroad consultation session, take preparatory language courses if required, and should clarify credit transfer arrangements in accordance with the relevant examination regulations by completing a study abroad learning agreement. Information on study abroad opportunities, exchange programmes, scholarships and administrative formalities is available from the Saarland University International Office or from the relevant departmental or subject representative. As foreign host universities and scholarship-awarding bodies often have early application deadlines and long application processing times, study abroad applications should normally be submitted to the Examinations Office one year before the planned start date.

Section 9
Bachelor's thesis and Bachelor's seminar

- (1) By completing a Bachelor's degree thesis, students demonstrate that they are able to work independently on tackling problems in data science, artificial intelligence or machine learning. The thesis topic will be taken from one of these subdisciplines and will be supervised by a member of teaching staff on the Data Science and Artificial Intelligence degree programme. The completion period for the thesis is three months. Students are awarded 12 ECTS credits for completing their Bachelor's thesis.
- (2) Before finishing their Bachelor's thesis, each student shall have successfully completed a Bachelor's seminar in an area with direct relevance to the topic being addressed in the thesis. Students attending a Bachelor's seminar shall give an oral presentation on the problem they propose to tackle in their thesis project and submit a written description of the issues to be addressed.
- (3) Students shall register their Bachelor's thesis project with the Examinations Office no later than one semester after successfully completing the Bachelor's seminar. Students who fail to meet this deadline will be required to successfully complete another Bachelor's seminar.

Section 10
Commencement

These regulations shall come into force on the day after they are announced in the Official Bulletin of the Institutions of Higher Education in Saarland (*Dienstblatt der Hochschulen des Saarlandes*).

Saarbrücken, 30 July 2019

President of Saarland University
Univ.-Prof. Dr. Manfred J. Schmitt

Appendix A and B: Please refer to the original German version.