ASIIN Seal & Euro-Inf

Accreditation Report

Bachelor's Degree Programmes
Software Engineering
Discrete Mathematics and Computer Science

Master's Degree Programmes
Software Engineering
Artificial Intelligence and Language Technology

Provided by
Reykjavik University

Version: 24.03.2023

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A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Hugbúnaðarverkfræði BSc	Software Engineering BSc	ASIIN, Euro-Inf® Label	/	04
Tölvunarstærðfræði BSc	Discrete Mathematics and Computer Science BSc	ASIIN, Euro-Inf® Label	Euro-Inf 2016-2021 (EQANIE)	04, 12
Gerivgreind og Máltækni MSc	Artificial Intelligence and Language Technology MSc	ASIIN, Euro-Inf® Label	/	04
Hugbúnaðarverkfræði MSc	Software Engineering MSc	ASIIN, Euro-Inf® Label	/	04
Date of the contract: 25.01.2021 **Submission of the final version of the self-assessment report:** 20.10.2021 **Date of the onsite visit:** 17.-19.11.2021 **at:** Reykjavik, Iceland				
Peer panel: Prof. Dr. Armin Iske, University of Hamburg Prof. Dr. Bettina Harriehausen-Mühlbauer, University of Applied Science Darmstadt Prof. Dr. Georg Schneider, Trier University of Applied Sciences				

[1] ASIIN Seal for degree programmes; Euro-Inf®: Label European Label for Informatics

[2] TC: Technical Committee for the following subject areas: TC 04 - Informatics/Computer Science; TC 12 - Mathematics

Daniel Burkhardt, Student at University of Freiburg	
Representative of the ASIIN headquarter: Christin Habermann	
Responsible decision-making committee: Accreditation Commission for Degree Programmes	
Criteria used: European Standards and Guidelines as of May 15, 2015 ASIIN General Criteria, as of December 10, 2015 Subject-Specific Criteria of Technical Committee 04 – Informatics/Computer Science as of March 29, 2018	

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Software Engineering	B.Sc.	/	6	Full time	/	6 Semester	180	Annually Fall 2012
Discrete Mathematics and Computer Science	B.Sc.	/	6	Full time	/	6 Semester	180	Annually Fall 2005
Software Engineering	M.Sc.	/	7	Full time	/	4 Semester	120	Each semester Fall 2008
Artificial Engineering and Language Technology	M.Sc.	/	7	Full time	/	4 Semester	120	Each semester Fall 2007

For the Bachelor's degree programme Discrete Mathematics and Computer Science the institution has presented the following profile in the self-assessment report:

"The aim of the BSc in Discrete Mathematics and Computer Science programme is to form graduates who have strong mathematical foundations, and who can apply the methods and tools of computer science to solve challenging problems in fields ranging from pure mathematics to design, software development and finance, to name a few."

For the Bachelor's degree programme Software Engineering the institution has presented the following profile in the self-assessment report:

"The aim of the BSc in Software Engineering programme at Reykjavík University is to educate computing professionals who will apply sound engineering methods in the design, development, and maintenance of reliable software systems. The programme gives students a firm basis in Computer Science and core engineering subjects. Moreover, it emphasises project management and quality control."

[3] EQF = The European Qualifications Framework for lifelong learning

For the Master's degree programme Artificial Intelligence and Language Technology the institution has presented the following profile in the self-assessment report:

"The MSc in Artificial Intelligence and Language Technology (MAILT) is a two-year, 120-ECTS study programme. The programme aims to graduate students with the necessary knowledge to manage and/or implement artificial intelligence and language technology projects. Moreover, it prepares students for PhD studies in those fields.

Students need to be registered in the MAILT programme at Reykjavík University or in the MA programme in Language Technology at the University of Iceland but can pursue relevant courses at both universities. A student graduates from the university at which he/she is registered and produces a final master's project/thesis under the supervision of a researcher at that university. A student registered at Reykjavík University graduates with an MSc degree, whereas a student registered at the University of Iceland graduates with an MA degree. At least 2/3 of the course credits required for graduation must be from master-level courses in Computer Science, Engineering, or from the MA programme in Language Technology at the University of Iceland."

For the Master's degree programme Software Engineering the institution has presented the following profile in the self-assessment report:

"The MSc in Software Engineering includes only four mandatory courses, each worth 8 ECTS: Research Methodology, Modelling and Verification, Software Project Management, and Theory of Computation (6 credits if not already completed at BSc level). Students may take course credits in BSc courses at the Department of Computer Science or the Department of Engineering, if those courses are advanced courses, and do not overlap with courses that students have completed before. The list of acceptable courses is posted before each semester. Both the course- and the research-based routes give students a significant advantage in industry and prepare them for further studies."

C Peer Report for the ASIIN Seal[4]

1. The Degree Programme: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)

Evidence:

- Self-Assessment Report
- Study plans of the degree programme
- Module descriptions
- Procedure of mapping module learning outcomes
- Stakeholder surveys
- Webpage of all degree programmes
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The auditors refer to the Subject-Specific Criteria (SSC) of the Technical Committee Informatics/Computer Science (TC 04) as a basis for judging whether the intended learning outcomes of the Bachelor's degree programme Software Engineering, the Bachelor's degree programme Discrete Mathematics and Computer Science, the Master's degree programme Artificial Intelligence and Language Technology as well as the Master's degree programme Software Engineering, as defined by Reykjavik University (RU), correspond with the competences as outlined by the SSC. They come to the following conclusion:

The qualification objectives of the BSc Software Engineering aim to produce graduates that are capable of applying sound engineering methods in the design, development and maintenance of reliable software systems. The programme allows students to reach a

[4] This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.

firm basis in Computer Science and Engineering subjects. Moreover, students shall gain qualifications in Project Management and Quality Control.

Graduates of the Bsc Discrete Mathematics and Computer Science have gained a strong mathematical foundation, are able to apply the methods and tools of computer science to solve challenging problems in fields ranging from pure mathematics to design, software development and finance.

The qualification objectives of the MSc Artificial Engineering and Language Technology should ensure that graduates are able to manage and/or implement artificial intelligence and language tools and thus prepare them for a PhD in this field.

Graduates of the MSc Software Engineering have gained an excellence in scientific and industrial relevant domains, based on both theoretical foundations and practical experience with an international perspective, and prepare them for participating in building and managing complex and large software systems and infrastructure.

The auditors hold the view that the objectives and intended learning outcomes of all four degree programmes under review are generally reasonable and well founded and match the respective EQF level (6 for Bachelor's and 7 for Master's degrees). Yet, they understand that the Master's degree programmes can be undertaken in either a research-based or a course-based option. In the research-based option, students write an individual master's thesis reporting on 60 ECTS worth of research work, whereas the master's thesis in the course-based option can be co-authored by a small group of students and is worth 30 ECTS. However, the two options differ not only in the different number of ECTS credits for the Master's thesis: Since both programmes have 120 ECTS credits, the course-based option contains 30 ECTS more modules; the students thus gain in-depth knowledge, which is replaced by in-depth research in the research-based option. The auditors consider both options to be quite functional and appropriate. However, since they pursue different goals - research vs. in-depth knowledge - the auditors ask that these different options already be included in the qualification goals of the Master's degree programmes. The track chosen by the students should also be indicated on the Diploma Supplement.

The auditors further discuss the low number of students taking on the Master's programmes (5 students per year in the MSc Software Engineering, 3 students per year in the MSc Artificial Intelligence and Language Technology). During the discussions with the industry representatives, they learn the Icelandic industry does neither require employees to hold a Master's degree nor actively encourages them to attain one. On the opposite, since the need for qualified employees in the field of software engineering and computer science is currently very high in Iceland, companies will hire graduates even before they

have finished their Bachelor's degree and do not wish them to leave the company for undertaking additional studies. As a professional career thus does not require students to obtain a Master's degree, very few students opt to do so. Those that do are oftentimes planning a career in research or simply opt to learn more.

In addition, the auditors learn during the discussions with the industry representatives, that there is no systematic involvement of them in the process of reviewing and developing the study programmes. Although they are quite familiar with each other, also due to the small size of the country, and cooperate with each other from time to time, in the view of the auditors, a systematic approach is lacking which ensures the participation of industry representatives in the further development of the study programmes. The same applies to other important stakeholders, such as students and alumni.

Nonetheless, the auditors can confirm that the qualification objectives and the overall strategic alignment of both Reykjavik University and the four study programmes at hand results in great chances for graduates on the national and international job market as well as opportunities to transfer to other academic programmes to complete a Master's or a PhD-programme.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report
- Study Regulations
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The auditors confirm that the English translation and the original Icelandic names of the BSc Software Engineering, BSc Discrete Mathematics and Computer Science, MSc Artificial Intelligence and Language Technology as well as MSc Software Engineering correspond with the intended aims and learning outcomes as well as the main course language.

The auditors wonder why the study programme BSc Discrete Mathematics and Computer Science is not simply named "Computer Science", given the fact that mathematics (and discrete mathematics) is always entailed in the study of computer science. They learn that the name should serve as a filter for potential students so they know right from the beginning that this study programmes contains a high number of mathematical modules. While indubitably an unusual title, the auditors nonetheless are of the opinion that it generally reflects upon the taught contents.

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Study plans of the degree programme
- Module descriptions
- Webpage of all degree programmes
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The curricula of both Bachelor's degree programmes consists of 180 ECTS, the curricula of both Master's programmes of 120 ECTS. All curricula encompass both mandatory and elective modules.

The curriculum of the BSc Software Engineering consists of 156 ECTS mandatory modules and 24 ECTS electives, which can be courses offered by the Department of Computer Science or the Department of Engineering. However, students can select elective courses offered at other departments for up to 12 ECTS.

The curriculum of the BSc Discrete Mathematics and Computer Science consists of 132 ECTS of mandatory modules and 48 ECTS in elective modules and activities, the latter including independent studies, undergraduate research opportunities or internships. The mandatory modules encompass 42 ECTS in Computer Science, 54 ECTS in Mathematics and 36 ECTS in Theoretical Computer Science. Among the electives, students must select at least 24 ECTS from the field of Computer Science.

As already discussed in 1.2, the auditors consider the title of the BSc Discrete Mathematics and Computer Science study programme to be unusual, also with regard to the emphasis on discrete mathematics. After reviewing the curriculum, however, the auditors are convinced that, in addition to discrete mathematics, all other mathematical principles are taught that are needed as a basis for computer science. Corresponding modules still originate from a former BSc Mathematics, which was discontinued due to low demand. In order to remain competitive with the University of Iceland, which offers a pure mathematics degree programme, the title of this degree programme focuses on discrete mathematics. The auditors consider this approach to be understandable, especially since the curriculum provides all the necessary content.

To complete a MSc in Artificial Intelligence and Language Technology, students need to take 120 ECTS. This programme is offered in cooperation with the University of Iceland. Students need to be registered either at Reykjavik University or University of Iceland but can pursue the relevant courses at both universities. A student graduates from the university at which he/she is registered and produces a final master's project under the supervision of a researcher.

Looking at the curricula for both study options (course- and research-based), the auditors can clearly distinguish which modules are offered at University of Iceland and which at Reykjavik University. They notice that the curricula of both options amount to more than 120 ECTS. In the course-based track, the first two semesters have 32 ECTS, the third 34 ECTS and the fourth 30 ECTS thus amounting to a total of 128 ECTS credits. The research-based options holds 32 ECTS in each of the first two semesters and 30 ECTS for the third and fourth semester, thus amounting to a total of 124 ECTS. The programme coordinators admit that this may be due to the modules being offered at two different universities as most of the modules at University of Iceland are 10 ECTS while those at Reykjavik University are 6 or 8 ECTS. Nonetheless, RU must ensure that the curricula of both study options only entail the allotted 120 ECTS credits.

The curriculum of the MSc Software Engineering consists of only four mandatory programmes, each amounting to 8 ECTS: Research Methodology, Modelling and Verification, Software Project Management and Theory of Computation**.** The other modules are electives. As most of the modules are elective courses, the auditors are glad to learn that individual consultations with students are offered on which modules they should choose.

During the discussion with the students, the auditors learned that they are generally very satisfied with the curricula of the four study programmes. However, they would like more opportunities to acquire soft skills such as project management or presentation skills that would aid them in their future career. In addition, although the auditors understand that the programmes have to follow a practical orientation, the exception being the research-option of the Master's degree programmes, they nonetheless believe that students should engage more with current scientific literature and practice scientific presentation.

The auditors gain the impression that the graduates of all four degree programmes under review are well prepared for entering the labour market and can find adequate jobs in Iceland. During the discussion with the auditors, the representatives from the industry confirm that the graduates have a broad scientific education, are very adaptable and have manifold competences, which allows them to find a job very easily.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report
- Higher Education Institution Act
- Discussions during the audit

Preliminary assessment and analysis of the peers:

Article 19 of the Higher Education Institution Act No. 63/2006 requires that students who wish to enrol in a higher-education institution must have completed a matriculation examination from an upper secondary school or equivalent final examination. As such, admission requirement for both Bachelor's programmes is a matriculation exam or equivalent qualification. In addition, both programmes require at least 21 credits from mathematics courses at high school.

According to the Iceland Qualification Framework for Higher Education Act no. 63/2006, students enrolling in master studies must have completed a Bachelor's degree or equivalent three-year study at higher-education level. Students are expected to enrol in a study programme that is based upon the learning outcomes they have acquired during studies at the first cycle of higher education.

Admission to the MSc in Artificial Intelligence and Language Technology requires a BSc in Computer Science, Computer Engineering or related areas. Students who have completed a university degree in another discipline can apply and their background and experience are then assessed separately.

Admission to the MSc in Software Engineering requires a BSc in Software Engineering or a related field. Students who do not hold a Bachelor's degree in Software Engineering are required to take core courses in Software Engineering before formally being admitted to the Master's programme.

Admission requirements for all study programmes can be found on the university's website. Here, interested applicants also find detailed information about the process of admission and the documents to be handed in.

In summary, the auditors find the terms of admission to be binding and transparent. They confirm that the admission requirements support the students in achieving the intended learning outcomes.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 1:

Criterion 1.3 – Qualification Goals

The university thanks the auditor for pointing out that the educational objectives and learning outcomes should reflect the specificities of the research-based and the course-based track and will indicate them in the Diploma Supplement.

Criterion 1.3 – Stakeholder Involvement

Reykjavic University agrees with the auditors that a systematic approach ensuring the participation of important stakeholders (students, alumni, industry) is currently lacking and is currently discussing how best to address this. Reykjavik University mandates periodic reviews of degree programmes that involve the above-mentioned stakeholder at three-year intervals. In addition, however, the programme coordinators plan to involve stakeholders more frequently. To start with, the Department Chair, the Chair of Research and Graduate Study Council and the Programme Administrators have started monthly meetings with representatives from RUMPS, the graduate-student association at the department, to discuss the quality of the Master's programmes and receive their feedback in an informal setting. RU has also just completed a draft report for the Subject Level Review mandated by the Quality Board for Icelandic Higher Education at five-year-intervals. Representatives of all stakeholders participate in the review of the quality of all the degree programmes in that exercise.

Criterion 1.3 – Amount of Credits for Ma Artificial Technology and Language Technology

RU explains that the courses shown in the course-based track and the research-based track at https://en.ru.is/st/dcs/graduate-study/msc-language-technology/#tab3 are examples of courses that the students can take, but not a fixed course plan. Some of these courses are indeed mandatory, while others are optional. This means that students who do not want to take more than 120 ECTS credits are able to do so.

When looking at the course-based track, the total number of ECTS shown on the web page is 128. In the third semester, a student could take an independent course (T-749-INDS) for 2 ECTS instead of a course at University of Iceland for 10 ECTS. The total would then amount to 120 ECTS. The same holds for the research-based track: by pursuing an independent course for 6 ECTS (or any other 6 ECTS course) in the second semester, instead of a course at UI for 10 ECTS, the total number of ECTS would also amount to 120.

RU has shared an overview of the ECTS graduates of the programme have collected, which shows that while the majority takes on more than 120 ECTS, some students have

graduated with 120 ECTS. RU plans on creating and emphasizing study plans that students in the programme can follow if they wish to graduate with exactly 120 ECTS.

The auditors thank RU for their statement and explanations and understands that graduating with 120 ECTS is indeed possible.

Criterion 1.3 – Soft Skills and Scientific Literature

RU states that all students in the Bachelor's programmes in Computer Science and Computer Science with Business as a Minor take the Software Engineering course, where soft skills are practiced and play a key role in the learning outcomes. The courses Software design and implementation and Software Processes and Project Management (three-week course) play a similar role for the students in the BSc in Software Engineering. Moreover, all students must take part in the Entrepreneurship course, which hones soft skills. However, RU will take this insightful suggestion to heart and will encourage lecturers in selected second and third year courses to incorporate more activities developing soft skills in their courses. By way of example, students in the DIMACS programme also develop soft skills in the Real-time Models course, which includes three presentations, group work and the writing of two project reports as described in the article at https://doi.org/10.1007/978-3-030-91550-6_1.

In addition, RU fully agrees with the suggestion of engaging students more with current scientific literature and practice scientific presentation. To address this suggestion, they will create and offer an elective, seminar-style Bachelor course on "Current Research in Computer Science", where students read, present and discuss scientific papers in the areas covered by the research centers at the department. The course is also deemed an ideal vehicle to attract Bachelor's students to undergraduate research opportunities.

In summary, the auditors deem criterion 1 to be **mostly fulfilled.**

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-Assessment Report

- Study plans of the degree programme
- Module descriptions
- Webpage of all degree programmes
- Discussions during the audit

Preliminary assessment and analysis of the peers:
Both Bachelor's programmes are offered by the Department of Computer Science. They have a duration of three years, covering 180 ECTS credits and consist of a collection of core courses (mandatory modules) and electives. In addition, the two programmes offer students the possibility to obtain credits through independent study activities or undergraduate research opportunities (both carried out under the supervision of faculty members), as well as via internships or periods of study abroad at one of the department's partner institutions. Each degree programme requires a 12-credit final group project, which is often carried out in cooperation with the industry, but may also be research-based.

Each of the two Master's programmes is a two-year, full-time programme covering 120 ECTS. As has been mentioned under criterion 1.3, the study plans of the MSc Artificial Intelligence and Language Technology indicate that the programme does cover more than 120 ECTS; in this case, the workload must be limited. The programmes have a course- and a research-based option. In the research-based option, students write an individual master's thesis reporting on 60 ECTS worth of research work, whereas the master's thesis in the course-based option can be co-authored by a small group of students and is worth 30 ECTS. As has been mentioned in criterion 1.1, the auditors are of the opinion that graduates of the two different options hold different skills: research-based vs. more in-depth practical knowledge. This should be mentioned in both the qualification objectives and the diploma supplement.

Students may take course credits in BSc courses or courses outside the Department of Computer Science or the Department of Engineering, provided that those BSc courses are advanced courses that do not overlap with ones that the students have completed before. The list of acceptable courses is posted before each semester. At least 2/3 of the required course credits must be from master-level courses in Computer Science. Students must satisfy a breadth requirement, by taking at least one (minimum 6 credits) master-level course from each of the following three major areas of Computer Science: Systems, Applications, and Theory. The auditors confirm that the Bachelor's courses chosen as electives in a Master's programme are indeed advanced courses that fulfil the requirements of EQF 7. In addition, students in the Master must achieve a higher level in the exams of these modules in order to pass them than in the Bachelor. Moreover, they see

that courses already taken during the Bachelor's cannot be taken again during the Master's programme.

The auditors inquire as to how the study programmes BSc in Discrete Mathematics and Computer Science, MSc in Artificial Intelligence and Language Technology and MSc in Software Engineering, especially their elective modules, can be offered given the small amount of students applying each year. The programme coordinators explain that it is possible to offer all these courses as they are used in many study programmes simultaneously. In addition, while the rate of permanent students in the programmes is quite low, the number of incoming students from other universities is rather high, which increases the overall number of students per module.

After analysing the module descriptions and the study plans, the auditors confirm that all degree programmes under review are divided into modules and that each module consists of coherent teaching and learning units.

In addition, the peers gain the impression that the choice of modules and the structure of the curriculum ensures that the intended learning outcomes of the respective degree programmes can be achieved.

Mobility

The main measure that the department uses to promote and support student mobility is the Erasmus Programme. For Erasmus study period, the department automatically recognizes the credits taken the foreign host institution. The department also awards credits for internships taken at one of its core cooperation institutions for up to 24 ECTS. All the department's internship programmes are duly and regularly advertised to students. The applications that the department receives are typically examined by a cognizant committee, which selects the students whom the department recommends for the given mobility.

Over the last four years, forty-four students from the Department of Computer Science have been on exchange study programmes and twelve students have been to the Fraunhofer Center for Experimental Software Engineering at the University of Maryland College Park. The number of exchange students who have been at the department over the last five years is 102.

Students enrolled in the MSc in Software Engineering have the opportunity to earn a "Nordic Master in Intelligent Software System" degree, a double degree with Mälardalen University (Sweden) and Abo Akademic University (Finland). The programme involves a term or a year at a guest university and includes financial support during the stay abroad. The focus of the programme is to provide students with an excellence in scientific and

industrial relevant domains, based on both theoretical foundations and practical experience with an international perspective, and prepare them to participate in building and managing complex and large software systems and infrastructure.

In addition, the Msc in Software Engineering also offers a Double Degree Programme with the Faculty of Science and Technology of the University of Camerino (Italy).

In summary, the auditors appreciate the effort to foster international mobility and support the students, both incomings and outgoings, in these endeavours.

Criterion 2.2 Work load and credits

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module descriptions
- Statistical data for each study programme
- Discussions during the audit

Preliminary assessment and analysis of the peers:
According to the Icelandic Higher Education Act No. 63/2006 Icelandic credits are equivalent to the European Credit Transfer System (ECTS). A full study programme shall thus consist of 60 credits per academic year (30 per semester) and reflect all student workload during that time. Student workload includes class attendance, preparation, project work and assessment. The department can grant a student allowance to register him/herself for up to 38 ECTS each semester. According to calculation behind one ECTS unit, students can expect to work for 25-30 hours a week for every ECTS.

RU states in their self-assessment report that the instructor of a module is responsible to include the total number of hours that a student is expected to work on average on each of the listed study components as well as the course in total. This information is then handed in to the Director of Studies before the course starts. However, it has proven difficult to get that information on time from all instructors, which means that not all instructors are aware of the expected workload and the director has no chance to correct if beforehand if necessary. An additional problem is that the teaching evaluation survey does not include a question regarding the student workload. As such, there is no dependable way to monitor and – if necessary – revise the workload of the students. During the discussions with the students, the auditors learned that students feel that credits are arbitrarily distributed and do not correspond to the actual workload of each respective module. As such, RU must ensure that the credits awarded for the modules do indeed

match the workload of the students. In order to do so, a process must be established to regularly evaluate and adept the workload.

The auditors further notice that students on average finish their degree within the allotted time, despite working full-time or having a family. As the students explain, this is due to the costs of the programme which work as an incentive to not prolong their studies. In addition, all programmes have the option to be studied in part-time, which is utilized by some students, especially in the Master's programmes. This may be one of the reasons why all programmes have a very high success rate. The only exception here is the programme BSc Distinct Mathematics and Computer Science. The programme coordinators and students explain that some students drop out within the first two semesters and change to another, less mathematically-focused programme. As the success rate is still over 60%, the auditors do not values this critically.

Criterion 2.3 Teaching methodology

Evidence:

- Self-Assessment Report
- Teaching handbook
- Study plans and module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:
Each of the degree programmes submitted for accreditation consists of several different course formats. A typical 12-week course consists of two 90-minute slots devoted to lectures and one 90-minute slot devoted to a small group-exercise/laboratory session. In addition, in some of the early semesters, the Department of Computer Science offers a so-called "open-exercise session", during which students can ask for assistance and further explanation on any of the courses they are currently following to several teaching assistants. Given the small number of students in most classes, course slots devoted to "lecturing" often combine standard delivery of course materials with hands-on exercise sessions and peer-instruction. Moreover, some courses are based on blended learning and some three-week courses mainly consist of group work.

The department has ensured that project-based courses are not adversely affected by the increase in class sizes over time by providing supplementary resources. For example, several of the department's project-based courses (Practical Project I, Practical Project II,

Undergraduate Research Opportunity, Final Project) are taught in such a way that students work in small groups on realistic projects and, in case of their final project, in collaboration with industry partners.

In summary, the peer group judges the teaching methods and instruments to be suitable to support the students in achieving the intended learning outcomes. In addition, they confirm that the study concept of all four-degree programmes comprises a variety of teaching and learning forms as well as practical parts that are adapted to the respective subject culture and study format. It actively involves students in the design of teaching and learning processes (student-centred teaching and learning).

Criterion 2.4 Support and assistance

Evidence:

- Self-Assessment Report
- Organisation and Operation Rules of RU
- Discussions during the audit

Preliminary assessment and analysis of the peers:
Reykjavik University emphases the use of modern and diverse methods of teaching and provides students with support services that contribute to student-centred learning and academic progress, such as study facilities, classrooms, and library and information services. The university also offers specific services to international students and exchange students, students requiring special solutions. Moreover, it provides students with advice and assistance they need in their daily work and in managing their academic career. Reykjavik University regularly informs students about the services offered to them by the university.

The administrative office of the Department of Computer Science plays a key role in the student academic journey. Each study programme has a designated Programme Administrator whose main function is to support and assist students during their studies and to coordinate their navigation through their programme. The department´s administrative office is open to students during office hours for appointment and drop-ins, as well as via phone and e-mail. Student needs, concerns and feedback are channelled in a variety of ways through administrators, faculty, student representatives and specific entities created for dealing with the particularities of every case and programme.

Students at Reykjavik University have access to career and guidance counsellors, as well as free psychological services within the university. The career and guidance counsellors provide individual support for students during their studies at Reykjavik University, focus-

ing on the student´s strengths and interests. In addition to individual counselling, the career and guidance counsellors provide group counselling and a variety of lunch-time lectures and workshops. The university's psychological services are provided by a clinical psychologist and MSc students in the Clinical Psychology programme, who receive professional guidance. The university´s psychological services offer courses taught in Icelandic, as well as individual therapy sessions in Icelandic and English.

The peers notice the good and trustful relationship between the students and the teaching staff; there are enough resources available to provide individual assistance, advice and support for all students. The support system helps the students to achieve the intended learning outcomes and to complete their studies successfully and without delay. The students are well informed about the services available to them.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 2:

Criterion 2.2 – Workload

RU agrees that measuring the workload is one of the areas for improvement and acknowledges that greater success can be achieved in this regard. In order to obtain better data on student workload in each course, they plan on proceeding as follows:

1. Based on the experience with measuring student workload during the final BSc projects, as a pilot experiment, we will ask students in selected key courses to report the time they spend working on each course component as part of the delivery of assignments during the semester. To this end, they might follow the methodology in the study "Are Students Overworked? Understanding the Workload Expectations and Realities of First-Year Engineering" by Gerrard et al., ASEE Paper ID #18877, 2017.

2. Teachers of each course will be mandated to specify the estimated number of hours they expect students to spend on each course component and this information will be published with the course description. The aforementioned paper by Gerrard et al. provides useful information on how one might approach this goal in a coordinated and consistent fashion across courses. The paper "Give me time to think" by Karjalainen et al., University of Oulu (2006) gives a good breakdown of different course components and estimated workload per component on which we might build.

3. The Undergraduate Study Council will compare student-generated data with the student workload, as estimated by the teacher, for selected courses after each semester. Data collected by CLARU on students' use of resources on Canvas will also be useful.

4. The Undergraduate Study Council will gather information on how some other departments monitor student workload and use their experience to improve the processes.

In addition, RU mentions that Teaching Affair, the RU Curriculum Council and representatives from the student association at RU have just produced a revised version of the student course evaluation form that now also includes the question "How much or little did the workload in the course correlate with its ECTS credits, when each credit should amount to 25-30 hours of work?".

The peers thank RU for their explanation and believe the plans to be very promising.

In summary, the auditors deem criterion 2 to be **mostly fulfilled.**

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Exam tables
- Exam regulations (Rules on Study and Assessment, Teacher's Handbook)
- Exemplary exams and final theses / final projects

Preliminary assessment and analysis of the peers:
According to the self-assessment report and the exam regulations, in each individual course teachers examine whether students achieve the intended learning outcomes. Examiners award grades in whole and half numbers on a scale of 0 to 10. To pass a course, a Bachelor's students must receive a grade of at least 5.0 and a Master's students must receive a grade of at least 6.0.

The course teachers are responsible for writing all course examinations and assignments and for determining their weight in the final grade. The latter typically includes grades for performances in one or more of the following components: final examination, mid-term examination, class participation as well as projects, reports, simulations and other student work submitted during the course. The "Rules on Study and Assessment" and the "Teacher's Handbook" emphasise diversity in assessment, which means that no students is evaluated solely based on a final examination.

Written and oral final examinations and final assignments occur over a specific two-week period at the end of each semester. The examination and assignment schedule is available six weeks before the first final examination. There are usually between 3 and 4 final exams per semester as practical courses are evaluated via projects that are undertaken during the semester.

Makeup and resit final examinations or final assignments are taken after the end of the assessment period of each semester. If a student fails his first attempt at a resit or makeup examination or assignment he must repeat the entire module again. Disability compensations are in place for students.

The Bachelor's programmes require a 12-credit final project that is mostly carried out in groups of 2-3 students. The auditors con confirm that these projects are up to EQF Level 6a and that albeit a group project, each individual student's achievement is measured and individual grades are provided. The final projects is nearly always a piece of software development that allows students not only to utilize their theoretical skills in a practical manner but mimics the work in a company where multiple scientists collaborate on a joint project.

The Master's programmes entail either a final thesis of 30 or 60 ECTS-credit based on the tract the students choose. These theses can be done at RU or in cooperation with a local industry.

The auditors gain the impression that the examination system is set up to work smoothly and in the students' best interest. The students generally agree; yet they complain about the long correction period of some lecturers. While the examination period is generally stated in the examination regulation, some lecturers overstep these guidelines. This causes problems for the students who need to know if they have failed the class in order to prepare for the resit examination. In other cases, students were unable to select modules in the following semester

While the majority of lecturers does present the examination results on time, the auditors urge RU to take measures that ensure that the correction period determined in the examination regulations is met by every teacher.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 3:

The Department Chair and the Director of Undergraduate Studies will monitor delays in the delivery of exam results more closely. Delays in the correction of exams and in the

delivery of feedback on assignments will be one of the items that the Department Chair will discuss with the relevant faculty members during the annual performance reviews.

In summary, the auditors deem criterion 3 to be **mostly fulfilled.**

4. Resources

Criterion 4.1 Staff

Evidence:

- CVs of academic staff members, including full list of publications
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:
Reykjavik University has a Human Resource Strategy, whose aim is to ensure that teachers and other university staff have the appropriate qualifications. The Human Resource Strategy consists of transparent processes for recruitment and promotion of employees, and opportunities for their professional development.

The core teaching faculty at the Department of Computer Science at RU consists of 7 professors, 2 associate professors and 9 assistant professors. In addition, the Department of Computer Science hires 2 so-called adjuncts, a staff member who is hired, possibly part-time, for teaching purposes. The university presents a staff handbook that lists the qualification and accomplishments of all staff members.

Since Iceland itself has a limited population, the evaluators ask how a sufficient number of professors can be ensured. The programme coordinators state that their Department receives an annual budget for hiring new professors, yet it is difficult to actually recruit new professors. This is due to the fact that Iceland is a small country that produces a limited amount of graduates and doctorates. In addition, Computer Science is a competitive field internationally and not everybody is willing to relocate to Iceland. Nonetheless, RU advertises vacancies internationally and has been capable in the past to recruit a satisfactory amount of new staff members.

During the audit, the auditors learn that most teachers hold three courses per year, while those that have other functions at the university (e.g. the chairmen) have a reduced

workload of 1.5 classes per year. In addition, the number of classes taught also depends on the amount of students per class. The auditors believe that this teaching load leaves enough time for individual research projects and the support of an ever-growing number of PhD-students.

In summary, the auditors confirm that the composition, scientific orientation and qualification of the teaching staff is suitable for successfully implementing and sustaining the degree programmes. The auditors are furthermore impressed by the excellent and open-minded atmosphere among the students and the staff members.

Criterion 4.2 Staff development

Evidence:

- Teaching Handbook
- Professional Development Strategy
- Self-.Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

According to the self-assessment report, RU places special emphasis on providing employees with suitable training and opportunities to maintain their knowledge and grow professionally. The Human Resource Strategy of RU stipulates the efforts that must be made to enable employees to learn, grow and take on new challenges and increasing responsibility.

New teachers are trained and supervised by an older colleague. In addition, the Department of Computer Science offers a one-day orientation session for newly hired staff, whose sessions include opportunities for campus and community involvement, resources available at the Office of Teaching Affairs, and explanations and access to campus-wide record-keeping and reporting systems.

All teachers are able to enhance their teaching through the Teaching Affairs Office, which offers various workshops, e.g. for teacher training on Canvas, the learning management system, and extensive support for online teaching and hybrid classes.

Each research-active faculty member can apply for a sabbatical semester at three years' intervals. Apart from paying the salary of the faculty member, the department provides the faculty member with additional funds to support travel and accommodation visits for the research visit during the sabbatical. In addition, employees who intend to undertake

studies leading to an academic degree can apply for study leave or a temporary decrease in employment ratio.

In addition, staff members are also active in visiting international conferences or presenting themselves. As a member of Informatics Europe, for example, the department can now offer its faculty to attend workshops, courses and other career-development events organised by that association.

In summary, the auditors confirm that RU offers sufficient support mechanisms and opportunities for members of the teaching staff who wish to further develop their research and teaching skills.

Criterion 4.3 Funds and equipment

Evidence:

- Self-Assessment Report
- DCS space documents and plan
- IT-Benchmarking
- Tour during the audit

Preliminary assessment and analysis of the peers:
The Department Chair is accountable to the Dean of the School of Technology for the department's finances. The Chair prepares a budget for the department and must present it to the Dean, as part of the University´s comprehensive budgeting process. Provided that contribution goals are met, the department has substantial autonomy on how to allocate resources and invest in infrastructure. It should, however, be noted that the department relies heavily on the university for support services, such as technical support, IT, and marketing. Reykjavik University has a long-term agreement with the Icelandic State that assures the university a fixed amount for each active student, which varies with the degree course in which the student is enrolled, as well as funds for research activity. The key factor affecting the finances of the department has been to strengthen its core faculty. In addition, individual research budgets have been introduced, giving faculty increased autonomy in performing their research activity. Other costs, including compensation to part-time faculty, are the responsibility of the Programme Director.

During the audit, the auditors were able to visit the laboratories and teaching spaces. In addition, RU has provided extensive documentation, including lists of the laboratories and equipment. The Self-Assessment Report also provided details regarding the overall infrastructure of the university and its campuses. The auditors are convinced that the teaching

and office facilities, the library and the computer labs are sufficient for all students and staff members.

In summary, the auditors confirm that the current funding allows for maintaining the standards as well as purchasing further equipment, if necessary, and that RU generally holds enough work spaces and laboratories and that all laboratories are equipped with modern and sophisticated instruments. The students are also generally very satisfied with the infrastructure and equipment available to them; yet, the Bachelor students wish for more space to do group work or independent self-study, especially during the examination periods. While the auditors saw no such shortage during their visit, they nonetheless ask RU to take the students wish into consideration for future planning and are glad to hear that the university has already formed a Space Committee that works on proposals for the future use of the space available to the department and its research centres.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 4:

UP does not issue a statement for this criterion.

In summary, the auditors deem criterion 4 to be **fulfilled.**

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Module handbooks for all four degree programmes
- Discussion during the audit

Preliminary assessment and analysis of the peers:
The students, as all other stakeholders, have access to the module descriptions via RU's website.

After studying the module descriptions, the peers confirm that they generally include all necessary information about the persons responsible for each module, the teaching methods and work load, the awarded credit points, the intended learning outcomes, the content, the applicability, the admission and examination requirements, and the forms of assessment and details explaining how the final grade is calculated. They only notice that

most entries mention „lecturer notes provided by teachers“ as literature. Here, the auditors urge UGM to include actual literature as a reference for the students.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Exemplary of diploma per degree programme
- Exemplary of diploma supplement per degree programme

Preliminary assessment and analysis of the peers:
The peers confirm that the students of all four degree programmes are awarded a Diploma and a Diploma Supplement after graduation. The Diploma consists of a Diploma Certificate and a Transcript of Records. The Diploma Supplement contains all necessary information but is lacking statistical data as set forth in the ECTS User's Guide to categorise the individual result/degree. This needs to be added for future usage.

Criterion 5.3 Relevant rules

Evidence:

- Relevant regulations for all important matters
- All relevant regulations are published on the university's website

Preliminary assessment and analysis of the peers:
The auditors confirm that the rights and duties of both Reykjavik University and its students are clearly defined and binding. All rules and regulations are published on the university's website and hence are available to all relevant stakeholders. In addition, students receive all relevant course material in the language of the degree programme at the beginning of each semester.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 5:

Criterion 5.1 – Module Descriptions

RU will ask all lecturers to include actual literature as a reference for the students.

Criterion 5.2 – Diploma Supplement

RU states that it will add grade classification to the diploma supplement.

In summary, the auditors deem criterion 5 to be **mostly fulfilled.**

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- Organisation and Operational Rules
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The University´s Executive Committee oversees the management of the quality and standards at RU. The work of the Departments, the Curriculum and Research Council, and support services assist the Executive Committee. The University´s participation in various external quality exercises, including accreditation and benchmarking exercises, strengthens RU's international competitiveness.

RU actively monitors all its study programmes. RU reviews all study programmes, individual courses, learning outcomes and descriptions every three years. The process shall consider development within the respective discipline. The reviewers consult with stakeholders. The university publishes all changes that this process leads to. In discussing and reviewing study programmes, the reviewers shall focus following points: the content of the programme considering the latest research in the given discipline; the changing needs of society and industry; the students' workload, actual time spent on learning, dropout, and graduation rate; the effectiveness of procedures for assessment of students; the expectations, needs and satisfaction concerning the programme, the learning environment and support services of the programme.

Students are involved in the ongoing management of the programme via the Quality Council consisting of student representatives of the programmes (typically one from each study year), the programme administrator and the programme director. The Quality Council typically meets at least once each term to discuss quality-related issues and student satisfaction regarding the programmes and individual courses. It is the forum of discussion and dialogue between students and programme management, and it is a means to detect issues and irregularities early.

The auditors are of the opinion that the quality management system of RU generally reads very well. They are surprised, however, that the self-assessment report reads that "[the] department of computer science must improve its ability to put into action policies, procedures and strategic decisions that are taken at department or university-wide-level." The programme coordinators explain that enforcing the rules and regulations set forth has been an ongoing process. In 2006, when RU was still a rather small university, so the quality management system was based on informal structures albeit very efficient. When RU began to grow the informal quality management system was no longer enough and rules, regulations and various committees were implemented. However, so far, most of these committees work independently from one another and an overarching quality management system exists for the most part on paper alone.

A prime example of this is that evaluations are conducted, yet their results are not discussed with the students which leaves the feedback loop effectively open. There are two evaluations per module, a short one during the semester that mostly consists of questions towards the students' liking of the course, and a detailed one at the end of the semester, whose results are not shared with the students. The auditors gain the impression, that students are generally very outspoken at RU and that, given the general small sizes of the classes, they contact their teachers directly in case of criticism. Nonetheless, the auditors are of the opinion that RU must improve its quality management system. First, RU must ensure that the defined processes of the quality management system are actually applied. Second, the results of the evaluation and the students' criticism must be followed up and appropriate measures must be derived and communicated.

Furthermore, the auditors recommend that RU involve all stakeholders in the process of the continuing development of the programmes. During the discussion with the students and alumni they learned that they are generally willing to aid their university in improving their programmes but that such a feedback is not systematically asked for. Similarly, the industry representatives are very keen on working more closely with RU, especially since the university provides 75% of all Icelandic computer scientists and engineers and wishes RU would more actively involve them in reviewing and developing the programmes.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 6:

RU comments that they fully agree with the recommendation of the auditors to improve their quality management system. They will mandate that each teacher of each course discuss the results of the mid-term evaluation with all students and point out which suggestions they will implement and how. Many of the teachers already do so, but not all.

Moreover, a review framework of the degree programme will be implemented in a more structured fashion and at regular intervals, regarding all stakeholders.

In summary, the auditors deem criterion 6 to be **partially fulfilled.**

D Additional Documents

Before preparing their final assessment, the panel ask that the following missing or unclear information be provided together with the comment of the Higher Education Institution on the previous chapters of this report:

D 1. Module descriptions from modules taught at University of Iceland

E Comment of the Higher Education Institution (03.02.2022)

The institution provided a detailed statement as well as the following additional documents:

- Module descriptions from modules taught at University of Iceland

F Summary: Peer recommendations (23.02.2022)

Taking into account the additional information and the comments given by RU the peers summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Software Engineering	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027
Ba Discrete Mathematics and Computer Science	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027
Ma Software Engineering	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027
Ma Artificial Intelligence and Language Technology	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027

Requirements

For all degree programmes

A 1. (ASIIN 2.2) Ensure that the credits awarded for the modules correspond with the actual workload of the students. Thus a process must be established to regularly evaluate and adapt the workload.

A 2. (ASIIN 3) Take measures so that the correction periods determined in the examination regulation are met by the teaching staff.

A 3. (ASIIN 5.2) The Diploma Supplement must also entail statistical data as set forth in the ECTS User's Guide to categorise the individual result/degree.

A 4. (ASIIN 6) It must be ensured that the defined processes of the quality management system are actually applied. Especially the results of the evaluations and the student's criticisms must be followed-up and appropriate measures derived and communicated.

For the Master's degree programmes

A 5. (ASIIN 1.1) The educational objectives / learning outcomes must reflect the specificities of the research-based and the course-based track. The chosen track must also be included in the Diploma Supplement.

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to include a mandatory course in which students engage with current scientific literature and practice scientific presentation.

E 2. (ASIIN 1.3) It is recommended to offer the students the availability of soft-skills such as project management.

E 3. (ASIIN 1.3) It is recommended to have staff available for research.

E 4. (ASIIN 5.1) It is recommended to reference actual literature in the module descriptions and not simply refer to "lecture notes by teacher".

E 5. (ASIIN 1.1, 6) It is recommended to involve all stakeholder in the process of the continuing development of the teaching programmes.

G Comment of the Technical Committees

Technical Committee 04 – Informatics/Computer Science (08.03.2022)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and rephrases the recommendation E3, as the original meaning was unclear. Moreover, the Technical Committee slightly changes the recommendation E4.

Assessment and analysis for the award of the Euro-Inf® Label:

The Technical Committee deems that the intended learning outcomes of the degree programmes do comply with the Subject-Specific Criteria of the Technical Committee 04 – Informatics/Computer Science.

The Technical Committee 04 – Informatics/Computer Science recommends the award of the seals as follows:

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation**
Ba Software Engineering	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027
Ba Discrete Mathematics and Computer Science	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027
Ma Software Engineering	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027
Ma Artificial Intelligence and Language Technology	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027

Requirements

For all degree programmes

A 1. (ASIIN 2.2) Ensure that the credits awarded for the modules correspond with the actual workload of the students. Thus, a process must be established to regularly evaluate and adapt the workload.

A 2. (ASIIN 3) Take measures so that the correction periods determined in the examination regulation are met by the teaching staff.

A 3. (ASIIN 5.2) The Diploma Supplement must also entail statistical data as set forth in the ECTS User's Guide to categorise the individual result/degree.

A 4. (ASIIN 6) It must be ensured that the defined processes of the quality management system are actually applied. Especially the results of the evaluations and the student's criticisms must be followed-up and appropriate measures derived and communicated.

For the Master's degree programmes

A 5. (ASIIN 1.1) The educational objectives / learning outcomes must reflect the specificities of the research-based and the course-based track. The chosen track must also be included in the Diploma Supplement.

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to include a mandatory course in which students engage with current scientific literature and practice scientific presentation.

E 2. (ASIIN 1.3) It is recommended to offer the students the availability of soft-skills such as project management.

E 3. (ASIIN 4.3) It is recommended to have more supporting staff available to free up resources for research.

E 4. (ASIIN 5.1) It is recommended to reference literature in the module descriptions and not simply refer to "lecture notes by teacher".

E 5. (ASIIN 1.1, 6) It is recommended to involve all stakeholder in the process of the continuing development of the teaching programmes.

Technical Committee 12 – Mathematics (02.03.2022)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and follows the auditors' opinions.

The Technical Committee 12 – Mathematics recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Discrete Mathematics and Computer Science	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027

H Decision of the Accreditation Commission (18.03.2022)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The accreditation commission discusses the procedure and generally agrees with the assessment of the auditors and the technical committees involved. They wonder, however, why one third of all elective courses from the Master's programmes can be Bachelor's courses. To ensure that the higher education level (EQF 7) is still reached, the accreditation commission asks RU to establish a valid system when selecting elective courses.

Assessment and analysis for the award of the Euro-Inf® Label:

The Accreditation Commission deems that the intended learning outcomes of the degree programme do comply with the Subject-Specific Criteria of the Technical Committee 04 – Informatics/Computer Science.

The Accreditation Commission decides to award the following seals:

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation**
Ba Software Engineering	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027
Ba Discrete Mathematics and Computer Science	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027
Ma Software Engineering	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027
Ma Artificial Intelligence and Language Technology	With requirements for one year	30.09.2027	Euro-Inf®	30.09.2027

Requirements

For all degree programmes

A 1. (ASIIN 2.2) Ensure that the credits awarded for the modules correspond with the actual workload of the students. Thus, a process must be established to regularly evaluate and adapt the workload.

A 2. (ASIIN 3) Take measures so that the correction periods determined in the examination regulation are met by the teaching staff.

A 3. (ASIIN 5.2) The Diploma Supplement must also entail statistical data as set forth in the ECTS User's Guide to categorise the individual result/degree.

A 4. (ASIIN 6) It must be ensured that the defined processes of the quality management system are actually applied. Especially the results of the evaluations and the student's criticisms must be followed-up and appropriate measures derived and communicated.

For the Master's degree programmes

A 5. (ASIIN 1.1) The educational objectives / learning outcomes must reflect the specificities of the research-based and the course-based track. The chosen track must also be included in the Diploma Supplement.

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to include a mandatory course in which students engage with current scientific literature and practice scientific presentation.

E 2. (ASIIN 1.3) It is recommended to offer the students the availability of soft-skills such as project management.

E 3. (ASIIN 4.3) It is recommended to have more supporting staff available to free up resources for research.

E 4. (ASIIN 5.1) It is recommended to reference literature in the module descriptions and not simply refer to "lecture notes by teacher".

E 5. (ASIIN 1.1, 6) It is recommended to involve all stakeholder in the process of the continuing development of the teaching programmes.

For the Master's degree programmes

E 6. (ASIIN 1.3, 2.1) It is recommended to establish a valid system that ensures that if Bachelor's degree courses are utilised as courses in the Master's degree programme they contribute to the higher qualification level (EQF 7)

I Fulfilment of Requirements (24.03.2023)

Analysis of the peers and the Technical Committees (08.03.2023)

Requirements

For all degree programs

A 1. (ASIIN 2.2) Ensure that the credits awarded for the modules correspond with the actual workload of the students. Thus, a process must be established to regularly evaluate and adapt the workload.

Initial Treatment	
Peers	not (completely) fulfilled Justification: The university has established a very good process to involve the students in the calculation of the workload, which is explained in detail in their cover letter. But these figures have to show an effect in adapting the given workload to the feedback of the students. Latter has not happened yet.
TC 04	not (completely) fulfilled Justification: The TC agrees with the peers' opinion
TC 12	Fulfilled Justification: Concerning the Ba *Discrete Mathematics and Computer Science*, the submitted documents are sufficient to consider this requirement as fulfilled.
AC	Fulfilled Justification: A question on workload was included in the module evaluation. In addition, the faculty is experimenting with further attempts to survey the real workload. Although results could not have been presented yet, the AC is confident this process will lead to regular updates in the assigned student workload for

	each module.

A 2. (ASIIN 3) Take measures so that the correction periods determined in the examination regulation are met by the teaching staff.

Initial Treatment	
Peers	Fulfilled Justification: The taken measures to remind the instructors more often and more carefully seem to work- with the exception of 1 instructor. As this is an individual case, this instructor needs individual treatment that should not affect the entire department. It is an issue between this instructor and the chairman on a 1:1 basis.
TC 04	Fulfilled Justification: The TC agrees with the assessment of the experts.
TC 12	Fulfilled. Justification: The TC agrees with the assessment of the experts
AC	Fulfilled Justification: The AC agrees with the assessment of the experts

A 3. (ASIIN 5.2) The Diploma Supplement must also entail statistical data as set forth in the ECTS User's Guide to categorise the individual result/degree.

Initial Treatment	
Peers	Fulfilled Justification: The Diploma Supplement now shows the statistical data under bullet 4.5
TC 04	Fulfilled Justification: The TC agrees with the assessment of the experts
TC 12	Fulfilled. Justification: The TC agrees with the assessment of the experts
AC	Fulfilled/ Justification: TheAC agrees with the assessment of the experts

A 4. (ASIIN 6) It must be ensured that the defined processes of the quality management system are actually applied. Especially the results of the evaluations and the student's criticisms must be followed-up and appropriate measures derived and communicated.

Initial Treatment	
Peers	not (completely) fulfilled Justification: 4 different process are described which primarily

	aim at a yearly evaluation of classes, in which industry is partly involved. At no point it is mentioned how students are involved in this process and – even more important – how course evaluations of all courses are discussed with the current cohort of students, i.e. how the feedback look to and with the students is closed. This still need to be included.
TC 04	Not (completely) fulfilled Justification: The TC agrees with the assessment of the experts
TC 12	Fulfilled Justification: Concerning the Ba *Discrete Mathematics and Computer Science*, the submitted documents are sufficient to consider this requirement as fulfilled.
AC	Not (completely) fulfilled Justification: The university has done to improve the evaluation regarding the feedback of the evaluation towards the students. The TC 12 regards this requirement as fulfilled for the *Discrete Mathematics and Computer Science* as it considers this issue was more prominent in the other three study program. The TC 04 disagrees still considers it necessary to submit further documentation on the feedback loop of evaluation results is needed, which is supported by the AC.

For the Master's programme

A 5. (ASIIN 1.1) The educational objectives / learning outcomes must reflect the specificities of the research-based and the course-based track. The chosen track must also be included in the Diploma Supplement.

Initial Treatment	
Peers	not fulfilled yet Justification: According to the words of the rector, the Research and Graduate Study Council has reviewed the learning outcomes and will present updated learning outcomes for the research-based and course-based tracks for approval by the faculty in the spring semester 2023. Thus, this requirement remains unfulfilled.
TC 04	not fulfilled Justification: The TC agrees with the assessment of the experts
AC	Fulfilled Justification: The University has initiated the appropriate steps, which will then be officially decided at the next meeting of the Research and Graduate Study Council.

Decision of the Accreditation Commission (24.03.2023)

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ba Software Engineering	Requirement, A4, not fulfilled	Euro-Inf®	6 months prolongation
Ba Discrete Mathematics and Computer Science	All requirements fulfilled	Euro-Inf®	30.09.2027
Ma Software Engineering	Requirement, A4, not fulfilled	Euro-Inf®	6 months prolongation
Ma Artificial Intelligence and Language Technology	Requirement, A4, not fulfilled	Euro-Inf®	6 months prolongation

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Appendix: Programme Learning Outcomes and Curricula

According to [….] the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Software Engineering:

BSc in Software Engineering at Reykjavik University	
The BSc in Software Engineering at the RU is organised as a three - year programme (six semesters). To finish the programme, students need to complete 180 ECTS. On completing the Bachelor of Science in Software Engineering, students have achieved the learning outcomes shown below.	
KNOWLEDGE	
The learning outcomes for the BSc in Software Engineering state that degree holders possess knowledge of:	
1	A number of recurring themes, and a set of general principles that have broad application to the field of computer science
1	The social, legal, ethical, and cultural issues inherent in the discipline of computing
1, 2	That software systems are used in many different domains. This requires both computing skills and domain knowledge
1, 2, 3	Software development fundamentals, including programming, data structures, algorithms and complexity
1, 2, 3	Systems fundamentals, including architectures and organization, operating systems, networking and communication, parallel and distributed computation, and security
1, 2, 3	Mathematics, including discrete structures, statistics, calculus and optimization
1, 2, 3 1 ,2, 3	Software engineering principles, including a thorough understanding of software analysis and design, evaluation and testing and software quality and correctness Software engineering processes, including management of complex software development projects
1, 2, 3	Application fundamentals, including information management and intelligent applications
1, 2, 3	Multiple programming languages, paradigms, and technologies
SKILLS	
The learning outcomes for the BSc in Software Engineering state that degree holders can apply the methods and procedures as follows:	
1, 4, 6	Know how to apply the knowledge they have gained to solve real problems
3	Realize that there are multiple solutions to a given problem and these solutions will have a real impact on people's lives
3	Communicate their solutions to others, including why and how a solution solves the problem and what assumptions were made
2, 3, 4	Successfully apply the knowledge they have gained through project experience
3, 7	Encompass an appreciation for the structure of computer systems and the processes involved in their construction and analysis
3, 4, 5, 7	Understand individual and collective responsibility and individual limitations as well as the limitations of technical tools
7	Understand the range of opportunities and limitations of computing
COMPETENCES	
The learning outcomes for the BSc in Software Engineering state that degree holders can apply their knowledge and skills, as follows:	
1	Understand the multiple levels of detail and abstraction
1	Recognize the context in which a computer system may function, including its interactions with people and the physical world.
1	Able to communicate with, and learn from, experts from different domains throughout their careers
1, 2	Possess a solid foundation that allows and encourages them to maintain relevant skills as the field evolves
1, 4	To be able to manage their own career development and advancement
2	Manage their own learning and development, including managing time, priorities, and progress
3	Have developed interpersonal communication skills as part of their project experience
3	Work effectively both individually and as members of teams
3, 4	Make effective presentations to a wide range of audiences about technical problems and their solutions
4	Encompass an appreciation of the interplay between theory and practice

The following **curriculum** is presented:

B.SC IN SOFTWARE ENGINEERING

To complete a B.Sc. in Software Engineering, students need to complete 180 ECTS, of which 156 ECTS are mandatory. Each course is 6 ECTS, except the final project which is 12 ECTS. An example of a study plan can be seen in the table, however courses can be arranged differently as long as rules of prerequisites are followed.

1. semester – fall term	2. semester – spring term
T-111-PROG - Programming -6ECTS	T-201-GSKI – Data Structures - 6ECTS
T-103-STST – Discrete Mathematics for Engineering - 6ECTS	T-211-LINA- Linear Algebra - 6ECTS
T-101-STA1 – Mathematics I - 6ECTS	T-201-STA2 – Mathematics II - 6ECTS
T-133-UIAD – Interactive design -6ECTS	T-233-SRAD – System requirements and design- 6ECTS
T-113-VLN1 – Semester Project 1 (3. Week course) - 6ECTS	X-204-STOF – Nýsköpun og stofnun fyrirtækja (3. vikna) - 6ECTS
3. semester – fall term	**4. semester – spring term**
T-302-TOLF – Statistics 1 - 6ECTS	T-213-VEFF – Web programming - 6ECTS
T-301-REIR – Algorithms -6ECTS	T-501-FMAL – Programming Languages -6ECTS
T-107-TOLH – Computer Architecture- 6ECTS	T-215-STY1 – Operating Systems - 6ECTS
T-302-HONN – Software design and implementation- 6ECTS	T-202-GAG1 – Databeses - 6ECTS
T-333-HFOV - Software Processes and Project Management- 6ECTS	Elective Course (3. Week course) - 6ECTS
5. semester – fall term	**6. semester – spring term**
T-535-CPSY - Cyber Physical Systems - 6ECTS	T-419-STR2 - Concurrent and Distributed Programming - 6ECTS
T-409-TSAM – Computer Networks - 6ECTS	T-533-VIHU - Software Maintenance - 6ECTS
Elective Course - 6ECTS	T-631-SOE2 – Software Engineering II – Testing - 6ECTS
Elective Course - 6ECTS	T-404-LOKA – Final Project (15 week course) - 12ECTS
Elective Course (3. Week course)- 6ECTS	

Students take 24 ECTS of elective courses of their own choice. Students can choose elective courses within the department (i.e. Computer Science and Science and Engineering).

- If the choice is outside of the department students can apply for an assessment of up to 12 ECTS.
- Please note that the courses Applied Mathematics, Applied Information and Applied Statistics 1 (in School of Business) cannot be taken in the choice of the overlap with a core of software engineering.
- Note that you cannot get credit for T-216-GHOH software requirements and design and T-303-HUGB software engineering because of overlap

According to [….] the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Discrete Mathematics and Computer Science :

BSc in Discrete Mathematics and Computer Science at Reykjavik University	
The BSc in Discrete Mathematics and Computer Science at the RU is organised as a three - year programme (six semesters). To finish the programme, students need to complete 180 ECTS.	
On completing the Bachelor of Science in Discrete Mathematics and Computer Science, students have achieved the learning outcomes shown below..	
KNOWLEDGE	
The learning outcomes for the BSc in Discrete Mathematics and Computer Science state that degree holders possess knowledge of:	
1	A number of recurring themes, and a set of general principles that have broad application to the field of computer science and discrete mathematics
1	The social, legal, ethical, and cultural issues inherent in the discipline of computing
1, 2	That software systems are used in many different domains. This requires both computing skills and domain knowledge
1, 2, 3	Software development fundamentals, including programming, data structures, algorithms and complexity
1, 2, 3	Systems fundamentals, including architectures and organization, parallel and distributed computation, security and at least one of operating systems and computer networks
1, 2, 3	Discrete mathematics, including group theory, combinatorics, number theory and mathematical cryptography
1, 2, 3	Continuous mathematics, including calculus in one and several variables, linear algebra, and statistics
1 ,2, 3	Theoretical computer science, including the design and analysis of algorithms, the basic notions of computability and complexity, logic in computer science and its applications, and modelling and verification of computing systems.
1, 2, 3	Application fundamentals, including information management and intelligent applications
1, 2, 3	Multiple programming languages, paradigms, and technologies
SKILLS	
The learning outcomes for the BSc in Discrete Mathematics and Computer Science state that degree holders can apply the methods and procedures as follows::	
1, 4, 6	Know how to apply the knowledge they have gained to solve real problems
3	Realize that there are multiple solutions to a given problem and these solutions will have a real impact on people's lives
3	Communicate their solutions to others, including why and how a solution solves the problem and what assumptions were made
2, 3, 4	Successfully apply the knowledge they have gained through project experience
3, 7	Encompass an appreciation for the structure of computer systems and the processes involved in their construction and analysis
3, 4, 5, 7	Understand individual and collective responsibility and individual limitations as well as the limitations of technical tools
7	Understand the range of opportunities and limitations of computing
7	Know how to apply tools and ideas from mathematics and theoretical computer science to structure and solve complex problems
COMPETENCES	
The learning outcomes for the BSc in Discrete Mathematics and Computer Science state that degree holders can apply their knowledge and skills, as follows:	
1	Be able to reason at multiple levels of detail and abstraction, being aware, in particular, of the applicability and limitations of tools from mathematics and theoretical computer science
1	Recognize the context in which a computer system may function, including its interactions with people and the physical world.
1	Able to communicate with, and learn from, experts from different domains throughout their careers
1, 2	Possess a solid foundation that allows and encourages them to maintain relevant skills as the field evolves
1, 4	To be able to manage their own career development and advancement
2	Manage their own learning and development, including managing time, priorities, and progress
3	Have developed interpersonal communication skills as part of their project experience
3	Work effectively both individually and as members of teams
3, 4	Make effective presentations to a wide range of audiences about technical problems and their solutions
4	Encompass an appreciation of the interplay between theory and practice

The following **curriculum** is presented:

B.SC IN DISCRETE MATHEMATICS AND COMPUTER SCIENCE

To complete a B.Sc. in Discrete Mathematics and Computer Science students must complete 180 ECTS, of which 138 ECTS are mandatory, 18 ECTS are from capstone selection and 24 ECTS are elective credits. Each course is 6 ECTS, except the final project which is 12 ECTS. An example of a study plan can be seen in the table; however, courses can be arranged differently as long as rules of prerequisites are followed.

1. semester – fall term	2. semester – spring term
T-111-PROG - Programming - 6ECTS T-103-STST – Discrete Mathematics for Engineering - 6ECTS T-101-STA1 – Calculus I - 6ECTS T-107-TOLH – Computer Architecture - 6ECTS T-113-VLN1 – Semster Project 1 (3. Week course) - 6ECTS	T-201-GSKI – Data Structures - 6ECTS T-211-LINA- Linear Algebra - 6ECTS T-202-GAG1 – Databases - 6ECTS T-201-STA2 – Mathematics II - 6ECTS T-219-REMO– Real-time Models (3. Week course)- 6ECTS
3. semester – fall term	**4. semester – spring term**
T-301-REIR – Algorithms - 6ECTS T-302-TOLF - Statistics 1 - 6ECTS Elective or Capstone slection course -6ECTS Elective course- 6ECTS E-402-STFO – Mathematical Programming (3. week) - 6ECTS	T-501-FMAL – Programming Languages - 6ECTS T-604-HGRE – Design and Analysis of Algorithms - 6ECTS T-215-STY1 – Operating Systems or Elective Course T-218-ALOC - Algebra and Combinatorics - 6ECTS X-204-STOF – Entrepreneurship and Starting New Ventures - 6ECTS
5. semester – fall term	**6. semester – spring term**
T-519-STOR – Theory of Computation - 6ECTS T-409-TSAM – Computer Networks or Elective Course - 6ECTS T-513-CRNU – Cryptography and Number theory Capstone selection course- 6ECTS Elective Course (3. Week course) -6ECTS	T-505-ROKF – Logic in Computer Science - 6ECTS Elective course -6ECTS Capstone selection course- for example T-445-GRTH-Graph theory 6ECTS T-404-LOKA – Final Project (15 week course) - 12ECTS

Additional Notes:

- Students are required to take either Operating Systems or Computer Networks.
- Design and Analysis of Algorithms can be exchanged with Logic in Computer Science in the 4th and 6th semester.
- Algebra and Combinatorics is in rotation with Graph Theory
- Please note that the courses Applied Mathematics, Information Technology and Applied Statistics 1 (in School of Business) cannot be taken with a core of Software Engineering.
- Students who enrolled before fall 2016 are not required to take the course Entrepreneurship and Starting New Ventures

According to [….] the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master's degree programme Artificial Intelligence and Language Technology:

[…]

The following **curricula** are presented:

1. The study plan when student take 30 ECTS master project-course based track.

1.term	2.term	3.term	4.term
T- 725 Natural Language Processing 8 ECTS- Mandatory course.	T-701-REM4 Research Methodology 8 ECTS- Mandatory course.	T-723-VIEN-Virtual Environments 8 ETS.	T-899-MSTH Master Project 30 ECTS- Mandatory
T-796-DEEP Introduction to Deep learning 6 ECTS.	T- 754-SPLS Spoken Language Processing 8 ECTS	T- 720-ATAI Advanced topics in AI 8 ECTST	
Introduction to Machine Learning 8 ECTS.	T- 717-SPST Speech Synthesis 6 ECTS- Three -week course	Speech Recognition 8 ECTS	
Íslensk Málkerfi of máltækni 10 ECTS. UI	Sjálfvirk málfrasráðgjöf 10 ECTS. UI.	Sjálfvirk málfarsráðgjöf 10 ECTS. UI.	
32 ECTS	= 32 ECTS	= 34 ECTS	= 30 ECTS

*UI- means courses taken at University of Iceland

2. The study plan when students take 60 ECTS thesis-research based track.

1.term	2.term	3.term	4.term
T- 725- Natural Language Processing 8 ECTS-Mandatory course	T-701-REM4 Research Methodology 8 ECTS- Mandatory	T-879-MSRS Master research 30 ECTS	T-899-MSTH Master thesis 24 ECT
Introduction to machine learning 8 ECTS	T- 754-SPLS Spoken Language Processing 8 ECTS		T-891-MSTD Master thesis defence 6 ECTS
T-796-DEEP Introduction to DEEP Learning 6 ECTS	T-717- SPST Speech Synthesis 6 ECTS- Three-week course		
Íslensk Málkerfi og máltækni 10 ECTS. UI	Sjálfvirk málfarsráðgjöf 10 ECTS. UI		
= 32 ECTS	= 32 ECTS	= 30 ECTS	= 30 ECTS

*UI means courses taken at University of Iceland.

According to [….] the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master's degree programme Software Engineering:

[…]

The following **curriculum** is presented:

M.Sc. IN SOFTWARE ENGINEERING.

To complete a M.Sc. in Software Engineering, students must complete 120 ECT, of which 60 ECTS are mandatory. Each course is either 8 ECTS or 6 ECTS except for the final project which is 30/60 ECTS. An example of study plan can be seen in the table; however, courses can be arranged differently as long as the rules of prerequisites are followed.

1.term	2.term	3.term	4.term
T-519 STOR Theory of computation (if not already finished) 6 ECTS-Mandatory.	T-701 REM4 Research Methodology 8 ECTS-Mandatory	If course-based track: Elective course 8 ECTS, Elective course 8 ECTS, elective course 8 ECTS and elective three-week course 6 ECTS.	If course-based track: T-899-MSTH Master project 24 ECTS and T-T-991-TPDE Master project defence 6 ECTS-Mandatory.
Elective 8 ECTS	T-707-MOVE Modelling and Verification 8 ECTS-Mandatory	If research-based track: T-879-MSRS Master research 30 ECTS-Mandatory.	If research-based track: T-899-MSTH Master thesis 30 ECTS andT-891-MSTD Master thesis defence 6 ECTS-Mandatory.
Elective 8 ECTS	Elective 8 ECTS		
Elective 8 ECTS	Elective-three-week course 6 ECTS		
Elective three-week course 6 ECTS (skip if student take T-519).			
= 30	= 30 ECTS	= 30 ECTS	= 30 ECTS