



ASIIN Seal & Euro-Inf[®] Label Accreditation Report

Bachelor's Degree Programme

Computer Science

Software Engineering

Big Data Analysis

IT Management

Master's Degree Programme

Computer Science and Engineering

Applied Data Analytics

Project Management

Provided by

Astana IT University

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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
Компьютерные науки	B.Sc. Computer Science	ASIIN, Euro-Inf [®] Label		04
Программная инженерия	B.Sc. Software Engineering	ASIIN, Euro-Inf [®] Label		04
Анализ Больших данных	B.Sc. Big Data Analysis	ASIIN, Euro-Inf [®] Label		04
Менеджмент	B.Sc. IT Management	ASIIN, Euro-Inf [®] Label		07
Компьютерные науки и инженерия	M.Sc. Computer Science and Engineering	ASIIN, Euro-Inf [®] Label		04
Прикладная аналитика данных	M.Sc. Applied Data Analytics	ASIIN, Euro-Inf [®] Label		04
Управление проектами	M.Sc. Project Management	ASIIN		07
<p>Date of the contract: 23.11.2022</p> <p>Submission of the final version of the self-assessment report: 03.10.2023</p> <p>Date of the onsite visit: 10.&11.01.2024</p> <p>at: Astana IT University</p>				
<p>Expert panel:</p> <p>Prof. Dipl. Des. Julia Schnitzer, Brandenburg University of Applied Sciences</p>				

¹ASIIN 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 07 - Business Informatics/Information Systems.

A About the Accreditation Process

Prof. Dr. Vera Meister, Brandenburg University of Applied Sciences Prof. Dr. Christian Janiesch, TU Dortmund University Prof. Dr. Paul Grimm, Hochschule Darmstadt University of Applied Sciences Aziza Shuzheyeva, Head of the Digital Transformation Foundation, Commercial Director Brand agency BIGNAME LLP & President of TECHNOWOMEN Ualikhan Sadyk, student representative from Suleyman Demirel University	
Representative of the ASIIN headquarter: David Witt	
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 07, 2021 Subject-Specific Criteria of Technical Committee 04 – Informatics/Computer Science as of March 29, 2018 & of Technical Committee 07 – Business Informatics/Information Systems as of December 8, 2017	

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) First time of offer
Computer Science	B.Sc.	Information and Communication Technologies	6	Full time	-/-	9 Trimester	240 ECTS	September 2019
Software Engineering	B.Sc.	Information and Communication Technologies	6	Full time	-/-	9 Trimester	240 ECTS	September 2019
Big Data Analysis	B.Sc.	Information and Communication Technologies	6	Full time	-/-	9 Trimester	240 ECTS	September 2019
IT Management	B.Sc.	Business and Management	6	Full time	-/-	9 Trimester	240 ECTS	September 2019
Computer Science and Engineering	M.Sc.	Information and Communication Technologies	7	Full time	-/-	2 years	120 ECTS	September 2022
Applied Data Analytics	M.Sc.	Information and Communication Technologies	7	Full time	-/-	2 years	120 ECTS	September 2022
Project Management	M.Sc.	Business and Management	7	Full time	-/-	2 years	120 ECTS	September 2022

In its Self-assessment report, Astana IT University (AITU) introduces the university's general approach and concept as follows: "Astana IT University has been launched on September 1st, 2019, enrolling the first batch of students in 8 Bachelor's programmes. The university

³ EQF = The European Qualifications Framework for lifelong learning

is located on the Expo 2017 campus, an iconic technology and innovation centre in Astana, Kazakhstan. Astana IT University is designed as a pure IT university with an innovative educational programme, in order to support the digital transformation of Kazakhstan, as defined in the Digital Kazakhstan strategy. It is supported and owned by major stakeholders in the field of digital transformation in Kazakhstan and Central Asia. Meanwhile, the university enrolled the 4th batch of student with 2332 students in total studying at Astana IT University (AITU) and 321 graduates having finished their studies successfully. By today, Astana IT University is one of the major drivers and competence centres in the field of IT and for the digital transformation. With this motivation and history, the goal of Astana IT University is to provide an academic and scientific IT education which is competitive and compatible on global levels and at the same time adapted to the needs of Kazakhstan. The academic education at Astana IT University is conducted in English and according to global standards and practices in the scientific field. The portfolio of study programmes prepares students for the full scale of IT-related professions.”

For the Bachelor’s degree programme Computer Science the institution has presented the following profile on its website:

“The educational program “Computer Science” (Computer Science) includes disciplines on the basics of IT technologies and software tools that allow students to position themselves as professionals in the field of IT technologies, including the development and maintenance of software of various scales. Based on the results of the training, students will freely master the skills of managing IT technologies in a company, as well as several programming languages, and will be able to develop software for large companies, such as banks, insurance companies, government and national organizations, and others. The program will also develop skills in developing an application for mobile devices, databases and a web application.”

For the Bachelor’s degree programme Software Engineering the institution has presented the following profile on its website:

“The educational program “Software Engineering” includes disciplines on the basics of IT technologies and software tools that allow students to position themselves as professionals in the field of IT technologies, including the development and maintenance of software of various scales. Based on the results of the training, students will freely master the skills of managing IT technologies in a company, as well as several programming languages, and will

be able to develop software for large companies, such as banks, insurance companies, government and national organizations, and others. The program will also develop skills in developing an application for mobile devices, databases and a web application.”

For the Bachelor’s degree programme Big Data Analysis the institution has presented the following profile on its website:

“The educational program “Big Data Analysis” (big data Analysis) will allow you to develop skills in the field of:

- analysis of large amounts of information;
- data management of the organization, industry;
- introduction of new technologies for data processing and analysis;
- development of new models of the organization’s information infrastructure, taking into account the capabilities of big data technologies.

The goal of “Big Data Analysis” educational program is to train students in the theoretical and practical aspects of data analysis, as well as to improve their skills in related industries such as mathematics, project management and entrepreneurship. Junior(junior)/ mid-middle (middle) data analysts in many sectors of the economy including communications, finance, healthcare, manufacturing, management and so on.”

For the Bachelor’s degree programme IT Management the institution has presented the following profile on its website:

“The program is designed to implement the principles of the democratic nature of educational management, expanding the boundaries of academic freedom and the authority of educational institutions, which will ensure the training of elite, highly motivated personnel for innovative and knowledge-intensive sectors of the economy. The educational program “IT Management” allows you to train specialists at the intersection of management, information technology, economics, marketing and finance.”

For the Master’s degree programme Computer Science and Engineering the institution has presented the following profile on its website:

“The educational program “Computer Science and Engineering” involves the use of modern models, methods and approaches in the field of data analytics, machine learning, artificial

intelligence, as well as software development in the learning process. The educational program involves the use or application of acquired knowledge in one of the areas of the economy, thereby covering not only the scientific component of the program, but also the applied part. As a result of training in the educational program “Computer Science and Engineering”, graduates will have the opportunity to work in scientific and industrial projects as a developer, software architect, process engineer.”

For the Master’s degree programme Applied Data Analytics the institution has presented the following profile on its website:

“The educational program “Applied Data Analytics” involves the use of modern models, methods and approaches in the field of data analytics, machine learning, artificial intelligence, as well as modeling and analysis of processes in the learning process. The educational program involves the use or application of acquired knowledge in one of the areas of the economy, thereby covering not only the scientific component of the program, but also the applied part. As a result of training in the educational program “Applied Data Analytics”, graduates will have the opportunity to work in scientific and industrial projects as a data analyst, business intelligence expert, process engineer.”

For the Master’s degree programme Project Management the institution has presented the following profile on its website:

“The program is designed to train managers to manage large national, regional and sectoral projects in various spheres of socio-economic life, including international projects. The program is aimed at forming a project-based approach to managing real investments based on a comprehensive multidimensional approach, taking into account the risks of projects. Methods of conducting scientific research on topical management issues are also being studied, including the use of information technologies for analyzing processes and projects using databases, knowledge banks.”

C Expert Report for the ASIIN Seal⁴

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
- Diploma Supplements for each degree programme
- Module descriptions
- Objective-module-matrices
- Webpage AITU
- Rules for the Development of Educational Programs of Higher and Postgraduate Education of Astana IT University LLP
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The experts base their assessment of the learning outcomes on the information provided in the module descriptions, in the diploma supplements, on the programmes' websites and in the Self-assessment report of the seven degree programmes under review. For each degree programme, AITU has described Educational Competencies (EC), Educational Outcomes (EO), and Qualification Profiles. The ECs and EOs are published on the University's website and easily accessible for students as well as other stakeholders. Furthermore, there are regular revision processes in place that take into account feedback by external and internal stakeholders. The involvement of external stakeholders is systematically ensured, as industry representatives, for example, are members of the academic committees who, together with the programme directors, are primarily responsible for the development and further development of the curricula.

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.

The experts refer to the Subject-Specific Criteria (SSC) of the Technical Committee Informatics/Computer Science and of the Technical Committee Business Informatics/Information Systems and use the objective-module-matrices and module descriptions for each programme as a basis for judging whether the intended learning outcomes correspond with the competences as outlined by the respective SSC.

The experts note that the relationship between ECs and EOs has been established in a comprehensible and logical manner. The development of learning outcomes of each study programme under review involves both internal and external stakeholders so that the curricula can be adapted and modified according to the needs of the industry and the graduates on a regular basis. For example, AITU regularly conducts surveys, through which the different stakeholders get the chance to assess the programmes and their main objectives and adapt them if necessary. Internal stakeholders include all of AITU members (students, teaching staff, and non-academic employees), while the external stakeholders include the industry, alumni, the government, and society.

AITU defines five overarching competences to be achieved by graduates of all programmes under review, further differentiated according to the respective qualification level (EQF-6/7): “The goal is that all graduates at least have the following competences:

- Knowing the relevant mathematics;
- Being able to program in 1-2 programming languages;
- Knowing and being able to assess and operate computer systems and IT infrastructure;
- For the business-oriented programmes: knowing and being able to apply business methods and tools;
- Being able to communicate in English on an academic level.”

In addition, AITU has the aim, that graduates of all programmes are prepared “for the full scale of IT-related professions, specifically for: Developing new digital solutions, Operating and deploying digital solutions, Applying digital technologies and methods in specific, relevant fields, Managing the digital transformation, especially with projects.”

In its Self-assessment report, for all seven degree programmes under review, AITU describes job profiles for graduates, as well as basic competences, core competences, scientific, practical, and soft skills that should be achieved by each graduate.

For the three Bachelor’s degree programmes Computer Science, Software Engineering and Big Data Analysis, each graduate should acquire basic competences in “Mathematics (Analysis, Linear Algebra, Statistics) level 1 + 2, Computer Science (Alg. + Data Structures, Computer Architecture + Operating Systems), Programming (Java, Python, C++) level 1+2, Web

Technologies (Frontend, Backend), Databases, Machine Learning, Project Management & Tools”, scientific and soft skills in “English, (Russian/Kazakh), Liberal Arts (History, Psychology etc.), Entrepreneurship, Research Methods & Tools” and practical/scientific skills in “Coding Lab, Capstone Project, Internship, Bachelor Project/Thesis.” Furthermore, in the Bachelor’s degree programme Big Data Analysis, “Statistics and Data Science (Advanced Python)” are also counted as basic competences.

For the Bachelor’s degree Computer Science, AITU defines that graduates should acquire core competences in “Advanced Programming (level 3), Software Engineering (level 1), Computer Science Theory (Algorithms), Cloud Computing, Distributed Computing, Block Chain, IT Security, Advanced Databases” and lists “Software / Hardware / System Architects, Scientists, System Operators (generalists)” as graduates’ job profiles.

For the Bachelor’s degree Software Engineering, AITU defines that graduates should acquire core competences in “Advanced Programming (level 3), Software Development Frameworks, Software Engineering (level 2): Software Architecture, Design Patterns, SW Quality and Testing, Cloud Computing, IT Security, Advanced Databases and lists “Software Developers (Web Applications, Mobile Applications, Database Applications, other), Software Tester, Requirements Engineers” as graduates’ job profiles.

For the Bachelor’s degree Big Data Analysis, AITU defines that graduates should acquire core competences in “High Performance Computing, Big Data and Distributed Systems, Deep Learning, Cloud Computing, IT Security, Advanced Databases” and lists “Data Analysts, Data Warehouse Operators, Process Engineers, Developers MIS and Data Processing Systems” as graduates’ job profiles.

For the Bachelor’s degree IT Management, AITU states “IT project managers, IT operations managers, Business Process Analysts, IT consultants” as typical job profiles for graduates. In this programme, students should acquire basic competences in “Mathematics (Analysis, Linear Algebra, Statistics) (level 1), Basic Computer Science (Computer Architecture + Operating Systems), Programming (Python, C++) (level 1), Web Technologies (Frontend), Databases, Enterprise IT, ICT literacy, Project Management & Tools, Business Administration, Finance, Economics, Management” and core competences in “Business Process Analysis and Engineering, IT Operations Management, Quality, Test and Change Management, Agile Project Management or IT Governance, IT Risk Management”. This programme also aims to teach soft, practical and scientific skills with a stronger focus on business topics, e.g. negotiation and business relations.

In its Self-assessment report, AITU lists the intended learning outcomes of each Master's degree programme under review and divides them into the categories "Knowledge", "Practical Skills", "Scientific Skills", "Personal Skills", and "Ability and Attitude".

Graduates of the Master's degree programme Applied Data Analytics should "become specialists for job profiles like: Data Analyst, Business Intelligence Expert, Developer of Data Warehouses, Management Information Systems, Process Engineer, Process Data Analyst, Process Supervisor." Therefore, AITU states the following intended learning outcomes:

"Knowledge:

- know the mathematical background of data science, especially in statistics;
- know data science algorithms, including artificial intelligence and learning algorithms;
- know the relevant data processing tools and database systems;
- know business process engineering methods and tools, including knowledge of process modelling languages and tools;
- know the complete data analytics chain with decision making, data visualisation, data mining, descriptive analytics, clustering, reporting, predictive modelling;
- domain knowledge in at least one relevant application domain, e.g. finance, business, industry 4.0, product management, security.

Practical Skills:

- be able to analyse data with mathematical methods;
- be able to use data processing software tools and mathematical software;
- possess programming skills for data analysis problems (e.g. R, Python);
- possess business process management and engineering skills.

Scientific Skills:

- mathematical skills, especially in optimization, linear algebra and statistics;
- Data analytics skills, especially in decision making, data visualisation, data mining, descriptive analytics, clustering, reporting, predictive modelling;
- Data science skills, especially statistical methods, machine learning techniques.

Personal Skills:

- thinking systematically and critically;
- problem solving skills, result-oriented working skills;
- willingness and ability to grow in professional and personal activities;
- team working skills;
- communication skills, ability to express complex matters to end users, stakeholders and management;
- openness, willingness and ability to understand stakeholders and their needs.

Ability and Attitude:

- the ability to understand, select and design data analysis algorithms;
- the ability assess and apply Big Data & database technologies an attitude towards detailed analysis and careful selection of the right methods and tools;
- the ability to identify and describe processes, ability to describe as-is-processes and define to-be processes, ability to measure and assess process performance (KPIs);
- the ability to solve domain specific problems with data science approaches.”

Graduates of the Master’s degree programme Computer Science and Engineering should “become specialists for job profiles like: System & Software Architects; Software Development Process Experts; Software Developers, Team Leaders; Management of Software Development Projects.” Therefore, AITU states the following intended learning outcomes:

“Knowledge:

- know software architectures and software design patterns;
- know the relevant software development processes and tools;
- know techniques and tools for reliability and security;
- know the complete software design flow and the related management methods;
- know about advanced database systems and advanced web frontend;

Practical Skills:

- be able to design and implement a software architecture;
- be able to set up software engineering processes and projects;
- be able to manage software development projects successfully;
- possess advanced programming skills for data bases and web frontend development;
- be able to design secure and reliable software solutions.

Scientific Skills:

- Mathematical skills, especially in algorithm analysis and statistics;
- Software architecture and design pattern analysis skills;
- Be able to select and apply relevant research methodology in the field of computer science and engineering, e.g. Design Science Research, experiments.

Personal Skills:

- thinking systematically and critically;
- problem solving skills, result-oriented working skills;
- willingness and ability to grow in professional and personal activities;
- team working skills;
- communication skills, ability to express complex matters to end users, stakeholders and management;

- openness, willingness and ability to understand stakeholders and their needs.

Ability and Attitude:

- the ability to understand, select and design software architectures and patterns;
- the ability assess and apply data processing and storage technologies;
- understand and critically judge security and IT operation risks;
- an attitude towards detailed analysis and careful selection of the right methods and tools;
- the ability to solve domain specific problems with software.”

Graduates of the Master’s degree programme Project Management should “become specialists for job profiles like: Project Manager, Programme Manager; Consultant in Project Management; Project Office Expert; Business Process Designer.” Therefore, AITU states the following intended learning outcomes:

“Knowledge:

- Know the relevant tools, methods and processes in project management;
- Know the relevant theoretical background in finance, business and HR;
- Know organisational theories about projects and project-based organisations;
- Know relevant project management frameworks and standards, e.g. PMI, IPMA and Scrum;
- domain knowledge in at least one relevant application domain, e.g. logistics, finance, production, infrastructure, public administration;

Practical Skills:

- be able to plan, lead and control projects;
- be able to develop and lead a project team and to perform as a team member;
- be able to assess the feasibility and financial profitability of projects;
- possess business process management and engineering skills;

Scientific Skills:

- know the ongoing scientific dialogue on project management;
- be able to analyse projects and develop new scientific findings from it;
- be able to analyse projects and project situations systematically and scientifically.

Personal Skills:

- thinking systematically and critically;
- problem solving skills, result-oriented working skills;
- willingness and ability to grow in professional and personal activities;
- team working skills and team leading skills;

- communication skills, ability to express complex matters to end users, stakeholders and management;
- openness, willingness and ability to understand stakeholders and their needs.

Social Skills:

- be able to assess the impact of projects and to lead them ethically and sustainably;
- willingness and competence to involve stakeholders in projects;
- motivation and ability to use projects for the benefit of the society.

Ability and Attitude:

- the ability to bring projects to success and to motivate project teams;
- the attitude of a servant and ethical leader;
- an attitude to sustainable and responsible project management;
- a positive attitude towards risks and changes of projects.”

All specific learning outcomes of all seven degree programmes under review, as listed in their diploma supplements, are listed in detail in the Appendix of this report.

In summary, the experts are convinced that the intended qualification profiles of all programmes under review allow graduates to take up an occupation, which corresponds to their qualification. The degree programmes are designed in such a way that they meet the goals set for them. The objectives and intended learning outcomes of all degree programmes under review are reasonable and well founded.

The experts conclude that the objectives and intended learning outcomes of the four Bachelor's degree programmes and the three Master's degree programmes under review adequately reflect the intended level of academic qualification (EQF 6 for the Bachelor's degree programmes, EQF 7 for the Master's degree programmes) and correspond sufficiently with the ASIIN Subject-Specific-Criteria (SSC) of the Technical Committee 04 – Informatics/Computer Science and Technical Committee 07 – Business Informatics/Information Systems.

Criterion 1.2 Name of the Degree Programme

Evidence:

- Self-Assessment Report
- Diploma Supplements for each degree programme
- Webpage AITU

Preliminary assessment and analysis of the experts:

The experts confirm that the English names as well as the Russian translations of all seven degree programmes under review correspond with the intended aims and learning outcomes as well as the main course language.

Criterion 1.3 Curriculum

Evidence:

- Self-assessment report
- Module descriptions of each degree programme
- Study plan of each study programme
- Webpage AITU
- Webpage of each degree programme
- Rules for recognition of learning outcomes of formal and non-formal education Astana IT University LLP
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The curricula of the study programmes are reviewed by the experts in order to identify whether the described programme objectives and learning outcomes can be achieved by the available modules. Course descriptions as well as overviews and competence-subject matrices matching the general learning objectives and the module contents were provided for a thorough analysis. In the Self-assessment report, the university gives a detailed overview of how the competences acquired with the presented curricula match the SSC 04 respectively SSC 07 learning outcomes. The curricula including the module handbooks are posted on the programmes' websites.

In its Self-assessment report, AITU describes the programmes' structure as follows: "The Bachelor's programmes are based on a 3-years, 9 trimesters, and 240 credits curriculum. The programmes start with the winter term (term 1, 4 and 7) which is conducted from beginning of September until mid of November (10 weeks). This is followed by a 2-3 weeks

period for exams and homework submission. The spring term (term 2, 5 and 8) is conducted from beginning of January until mid of March (10 weeks), again followed by the examination period. The summer term (term 3, 6 and 9) is conducted from mid of April until end of June (10 weeks) again followed by the examination period. Mid of July until end of August is the summer break.” The curricula of the three Master’s degree programmes under review are structured for two years and 120 credits. In the first year, the Master’s degree programmes follow the same trimester structure as the Bachelor’s degree programmes. The final year of the Master’s degree programmes, which is described the “research-oriented year”, is divided into two semesters.

In its Self-assessment report, AITU presents the general structure of the content of each Bachelor’s degree programme under review as follows: “The first 2 years cover the mathematics modules and most of the basic informatics modules (reflecting the SSCs). Year one is concluded by a project-based element (Coding Lab, Innovation Lab, Business Project). The second year is concluded by a Capstone/Research project which can be more focussed on practice or more focussed on science. The intention is to integrate several areas of knowledge and skills in a larger deliverable. In the summer break after the second year, students are doing an industrial internship in a company (with a report). The third year is concluded by a research project and a bachelor’s thesis. Furthermore, students do another industrial internship. [...] In all trimesters, students do modules from the canon of mandatory (according to Kazakh accreditation) transversal and scientific skills modules. These modules form a canon similar to the liberal arts studies which are part of all Anglo-American Bachelor’s programmes, offering students a more holistic general education in addition to the informatics core topics. These liberal arts modules cover 53 credits in each Bachelor’s programme. The first year has 30 (of overall 80) credits in this field, the second year has 16 (out of 80) credits and the last year has 7 (out of 80) credits in this field. The “liberal arts” [...] cover the same topics in each Bachelor’s programmes: 15 credits in the first year are focussed on additional English language training [...], 10 credits in the second year focus on either Russian or Kazakh language. Admitted students need to have either sufficient previous language skills in Russian or Kazakh and will be trained in the language they do not master yet, 8 credits in the first and second year are devoted to sports (physical culture), 2 credits on educational practice, 20 credits are devoted to Philosophy, History, Sociology, Cultural studies, Political science and Psychology, forming a canon of liberal arts. [...] Due to the joint modules in the curriculum and the common competence levels achieved in each year, students can change the programme after the first year without bigger obstacles.”

What is more, AITU presents the additional programme-specific specialisations for each Bachelor's degree programme as follows:

“The Bachelor of Science in Computer Science (CS) puts the focus on programming, software development and especially web development in the first year, adding the core topics of computer science and some advanced algorithm, database and programming classes in the second year and offering relevant recent computer science topics (cloud, AI, blockchain, security, computer graphics, distributed computing) into the third year.”

“The Bachelor of Science in Software Engineering (SE) is the same as Computer Science in the first year, adding advanced software development methods and programming in the second year and diving deeper into software engineering and architecture into the third year. The capstone project is moved to the third year to allow an integration of the full software engineering skills.”

“The Bachelor of Science in Analysis Big Data (BDA) is the same as Computer Science in the first year, adding specific modules on data science and statistics and a deeper insight into the data science capabilities of Python in the second year. The third year covers advanced topics in algorithms, high performance computing and machine learning for data analytics and data processing. As in all Bachelor's programmes, project management and scientific methods and tools are also part of the third year, preparing for the thesis work.”

“The Bachelor of Science in IT Management (ITM) is different from the other 3 Bachelor's programmes due to the modules on business administration, economics and business computing. This leads to less modules in mathematics (Calculus 2 and Computational Mathematics are skipped), less programming (only introduction to one programming language, basic frontend web development, and basic mobile app development), and less basic informatics (e.g. no algorithms). Instead, the first and second year contain basic modules on business administration, economics, finance and management. Based on this, the programme allows a specialisation on either IT operations management (covering business processes, IT operations, quality, and enterprise IT) or IT project management (covering advanced topics on software project management). In addition, modules with a focus on so-called soft skills (design thinking, presentation, communication, negotiation) are covered in the third year.”

In its Self-assessment Report, AITU presents the general structure of the content of each Master's degree programme under review as follows: “The Master's programmes are based on a 2-years curriculum (120 credits), with 3 trimesters (10 weeks each) in the first year and 2 semesters (15 weeks each) in the second year. The trimesters have the same timeframes as in the Bachelor's programmes. The second year is mainly individual and in-

dependent research time. The semester are mainly used to structure reviews and deliverables. The individual research work starts already in the first year where students are expected to deliver more and more refined research proposals and plans for review in each trimester. The first year covers modules on core topics. Same as in the Bachelor's programmes, there are basic core modules [...] and advanced topics [...] which put a focus on specific topics in the field of the study programme, offering choices between 2 or 3 options [...]. In the first two trimesters, students do modules from the canon of mandatory (according to Kazakh accreditation) transversal and scientific skills modules. These modules [...] in the curriculum tables) cover 20 credits and are the same in each Master's programme: 4 credits in the first trimester are focussed on intensified professional English language training, 12 credits focus on scientific skills and higher education didactics and teaching skills, 4 credits focus on managerial competence."

In addition, AITU describes the additional programme-specific specialisations for each Master's degree programme as follows:

"The Master of Science in Computer Science and Engineering (CSE) puts the focus on advanced software and systems engineering, both from the technical side (SW architecture & design patterns, databases, security, site reliability) and the managerial side (product and project management, QA)."

"The Master of Science in Applied Data Analytics (ADA) covers the whole data analytics chain from data acquisition via data processing and analytics to data understanding and decision making. This is supported by case studies, projects and modules on specific application domains (which can be chosen from different options)."

"The Master of Science in Project Management (PM) is devoted to the full scope of project management disciplines, covering the project management methods, processes and tools, the economic aspects, the team and people aspects, the financial aspects and modules on the project context."

In general, the experts gain the impression that all seven degree programmes under review are well structured and feature relevant content, effectively preparing students for the IT industry. Furthermore, the experts recognize that the AITU has taken a practical approach, which is standing out as a significant strength compared to other universities in Kazakhstan, where it is more common to focus on theoretical knowledge. The programme coordinators explain that sometimes, it is hard to argue in favour of more project-oriented education as theoretical courses are often rated more valuable in Kazakhstan. However, the experts are in favour of this orientation and learn in the various discussion rounds that this is also appreciated by students and industry. Industry representatives explicitly emphasize that AITU

students and graduates are characterized by greater practical skills. Therefore, the experts strongly support that AITU continues to prioritize the practical approach of its programmes.

Despite the overall positive assessment, the experts identify some areas for potential enhancement. One recommendation is to ensure that most of the practical components of the courses are conducted with synchronous supervision by instructors as they notice in discussions on site that this is often not the case. The experts are of the opinion that it would help the students if they had a direct contact person for practical tasks to whom they could turn if they had any questions or problems. This adjustment would allow students to receive immediate feedback and support, thereby improving their practical learning experience.

In addition, the experts discuss with the various stakeholders the different programming languages taught and used in all programmes. They learn that in the Bachelor's degree programmes, the students learn C++ first. The programme coordinators explain that they are of the opinion that it is easier for students to start with C++ and afterwards they can adapt their skills to other programming languages. Subsequently, different programming languages are used during the course of study, depending on the field of application and specialization. However, in the experts' opinion, this can lead to several programming languages being taught in the course of studies, but rarely for more than one trimester. According to the experts, this can lead to basic knowledge of several languages, but does not necessarily ensure an in-depth understanding of at least one programming language. Therefore, the experts recommend to use one programming language for a longer period than only one trimester in order to enable a deeper understanding of at least one programming language.

In addition, the experts discuss with the various stakeholders which topics are dealt with in the various programmes and whether there are subject areas that are not given sufficient consideration. It turns out that the various discussion partners (students, lecturers, industry representatives) primarily request more courses on the topics of digital transformation, entrepreneurship and artificial intelligence/machine learning. As these areas are becoming increasingly important in the modern IT landscape, more coverage of these areas would better prepare students for the future demands of the industry. This is supported by the experts, which is why they recommend that the university include more courses from these areas in all curricula.

Another point that was noticed by the experts when looking at the curricula and also raised by the students is the lack of specialisations and electives offered within a degree programme. The university provides a fairly fixed curriculum in all degree programmes with only a few options ("elective slots") and no classic elective system. For example, you can

choose between “Advanced Databases (NoSQL)” and “Storage Systems” in the core area of the Bachelor’s degree programme Computer Science in the fifth term. However, there are no larger blocks with elective modules and/or individual specialisation paths in any of the degree programmes. In addition, not all “elective slots” in the core areas always offer several options to choose from, which means that very strict courses of study are foreseen. The experts are of the opinion that AITU should think of offering more electives or even introducing minors in each programme in order to enable students to specialize more easily. During the discussion round, the students also emphasised that they would like to have more elective options. Therefore, the experts recommend to introduce more specializations and elective courses. AITU should consider introducing minors and ensure that every “elective slot” has at least two courses to choose from.

Furthermore, the experts discuss the language skills required in regard of the Bachelor’s degree programmes. In its Self-assessment report, the university states that “[p]ersons who have the valid international certificates (originals) confirming English language proficiency are exempted from taking the English language module” and further describes that knowledge of English at B1 level is sufficient for this. However, during the audit, the programme coordinators explain that students who hold a B1 level must also take English courses in their first year. Only when students can demonstrate a B2 level can they take language courses in German, Italian or Chinese instead of English. The experts would support this regulation. However, should it be the case, as described in the Self-assessment report, that B1 is already sufficient, the experts would be in favour of a recommendation to raise the required level to B2. They therefore ask the university to clarify which English language level is required to skip the English course in the first year of the Bachelor’s degree programmes.

When reviewing the module handbook for the Master's degree programme Project Management, the experts also noticed that some of the listed content relating to project management is repeated and shows possible redundancies. There is also an introductory course that deals with topics that are more likely to be at Bachelor's level. During the discussion, the programme coordinators explain that more than half of the new Master's students come from other universities and therefore have different knowledge in some areas. In order to bring everyone up to the same level, the university has therefore decided to offer an introductory course on the Master's programme as well. Those responsible note that they will discuss possible overlaps in content at the next Academic Council meeting and also use feedback from alumni to work out such points. The experts welcome this approach and recommend accordingly to look after redundancies regarding project management contents and that the university should investigate whether it would prefer to offer pre-courses instead of creating redundancies in the curriculum.

Summing up, the expert group is generally convinced of the structuring of the submitted curricula and the corresponding content level of the seven degree programmes under review. This is also confirmed by the satisfaction of the various stakeholders, which is evident in the different discussion rounds with students, alumni, industry representatives and teachers. In conclusion, the experts gain the impression that the content and the structure of the curricula of all seven degree programmes ensure that the respective intended learning outcomes of each degree programme can be achieved and that the students are well prepared for entering the labour market and can find adequate jobs or for further academic careers.

Student Mobility

Study achievements acquired abroad are recognised at AITU in accordance with the “Rules for recognition of learning outcomes of formal and non-formal education Astana IT University LLP.” In its Self-assessment report, AIT states “[i]n accordance with the provisions of the Lisbon Convention, the University recognizes the academic courses and credits mastered by students within the framework of academic mobility. AITU has agreements with 44 leading Universities and organizations: Beijing Institute of Technology (China), Kyungpook National University (South Korea), Lawrence Technological University (USA), Schmalkalden University (Germany), Plovdiv University (Bulgaria), Ankara University (Turkey) and other. The Learning Agreements provide an efficient preparation of the exchange to make sure that students receive recognition for the activities successfully completed at a partner university. It sets out the programme of study, approved by the student, before the start of the exchange. The Educational program department, International Cooperation Department, and the Registrar’s office of AITU provide assistance to students in preparing their learning agreements. During the exchange some amendments might be included in the Learning Agreement due to course cancellation or different language of instruction. Any changes must be approved by all abovementioned departments. After completing the exchange programme the student is required to submit transcript of records and recognition of credits upon arrival to AITU to ensure achieved learning outcomes. The International Cooperation Department checks for correct completion of the document, the student gets it signed by the director of the Educational Program and submits to the Registrar’s office. The final conversion of grades and credits is the responsibility of the Registrar’s office.” Students who wish to study abroad may receive a scholarship and financial support if they meet certain requirements in terms of academic merit and social contribution.

For the Bachelor’s degree programmes under review, the university recommends the terms 4, 6, or 7 as mobility windows and highlight that “[e]specially term 6 is well aligned

with the semester schedules of many European universities.” For the Master’s degree programmes under review, AITU identifies the second year of study as suitable for international student mobility.

During the discussion rounds, the programme coordinators explain that they want to encourage students to go abroad and try to make the recognition of external credits as flexible as possible. The difference between the trimester system at AITU and a semester system at other universities is reportedly not particularly critical, as recognition takes place at module level and not at semester level. However, as a young university, AITU is still growing in this respect. This applies to the number of international collaborations and agreements, to the number of students who go abroad and, above all, to incoming students. Moreover, there were restrictions due to the coronavirus pandemic shortly after the university was founded. In its Self-assessment report, the university states that for the Bachelor’s degree programmes, there were 0 incoming and 20 outgoing students in 2021 and 43 outgoing and 0 incoming students in 2022. According to the university, there are not yet any exchange students within the Master’s degree programmes, neither outgoing nor incoming, as these have only started in 2021. The experts understand that international cooperation must first be established and that the figures cannot yet be too high. However, they recognize the will of the AITU to drive forward an international orientation and provide a framework to promote this. During the discussions, students also indicate that they feel well informed and supported if they are interested in studying abroad. They had not yet heard of any negative experiences from those who had already taken advantage of the opportunity.

The experts recognise that the university has created a good formal framework that simplifies the recognition of external achievements. In general, they believe that the university is well equipped to deal with student and teaching staff mobility matters. In Summary, the experts appreciate the efforts to promote international mobility and encourage AITU to continue in this direction.

Criterion 1.4 Admission Requirements

Evidence:

- Self-assessment report
- Webpage AITU
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The admission procedure for the Bachelor’s degree programmes is constituted by regulations issued by the Kazakh Ministry of Education and conducted through a nationwide unified exam after completing the high school or professional school. The Unified National

Test (UNT) includes the examination of Kazakh and Russian, Mathematics, History of Kazakhstan and one elective subject, depending on the chosen specialty. Depending on national demand the Ministry of Education and Science defines a limited amount of scholarships for each Bachelor's programme offered to those with the highest score. A state grant includes free tuition and a scholarship for living expenses. It is also possible to enroll on a fee-paid basis; however, the required minimum score of the Unified National Test must still be met. Enrollment is carried out separately for each degree programme. In its Self-assessment report, AITU states that beside national regulations, "AITU imposes additional entry requirements for Bachelor programmes: "AITU Excellence Test" (AET), a comprehensive exam, which consists of two modules: English; fundamentals of computer science and logic. The AET exam is conducted in the form of an electronic test. To comply with the AET exam requirements; dispute resolution, an Appeal Commission is created by Rector's order. Persons who have the valid international certificates (originals) confirming English language proficiency are exempted from taking the English language module:

- International English Language Testing System (IELTS), threshold score - at least 5.0.
- Test of English as a Foreign Language Institutional Testing Program (TOEFL ITP) – at least 460 points.
- Test of English as a Foreign Language Internet-based Test (TOEFL IBT), thresh. 46-59.
- APTIS certificate with a result corresponding to level B1.
- Level B1 certificates issued by InterPress Language Centers in Astana, Almaty and Karaganda."

Furthermore, AITU describes in its Self-assessment report that "[m]ost Kazakh students study at AITU based on a national educational grant. Therefore, the admission to AITU bachelor and master programmes is carried out by placing an educational grant at the expense of the republican and local budget. A small group of students studies at the expense of the student's own funds and other sources. For the admission process, an Admission Committee is created, and the Executive Secretary is appointed by the Rector's order."

For admission to the Master's degree programmes applicants need to have a Bachelor's degree from a similar scientific background and have to pass an entrance exam, called comprehensive test (CT). Further, AITU describes in its Self-assessment report that "[a]cceptance of entering applications is carried out by the selection committee and (or) through the information system of the National Center for Teaching. The applicant to the AITU master program submits to the AITU Admissions Committee: application; document on education (original); test result certificate; medical certificate; identity document. Rector's order is issued to enroll. As adaptation courses for missing prior knowledge available,

AITU offer language courses to upgrade the language proficiency in summer period and within the academic year.”

In addition, the university provides documents that regulate the recognition of externally acquired credits and the corresponding transfer of credit points.

In conclusion, the university’s website informs potential students and stakeholders in detail about the requirements and the necessary steps to apply for admission into the programmes. The regulations also include rules for the recognition of qualifications achieved externally (e.g. at other higher education institutions or outside the higher education sector), which are clearly defined. AITU facilitates the transition between higher education institutions and with non-university places of learning without jeopardizing the achievement of learning outcomes at the desired level. Since the regulations are based on decrees by the ministry of education and on the university’s written regulations, the experts deem them binding and transparent.

Criterion 1.5 Workload and Credits

Evidence:

- Self-assessment report
- Module descriptions of each degree programme
- Study plan of each study programme
- Statistical data on student progress
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The study programmes under review are created following the basic principles of the Bologna Declaration. All seven study programmes therefore use European Credit Transfer System (ECTS) credits points to express the workload for students in each module, semester and academic year. The credits awarded are based on student workload, including both contact hours and self-study time as outlined for each course in the respective module descriptions. All mandatory components of the curricula award credit points for successfully mastering the module. One credit is equivalent to a workload of 30 hours.

The four Bachelor’s degree programmes award in total 240 ECTS points. The three Master’s degree programmes award in total 120 ECTS points. At AITU, one ECTS point is equivalent to 30 hours of work. The standard duration of study for the Bachelor’s degree programmes is 3 years (9 trimesters) for the Master’s degree programmes is 2 years (3 trimesters and 2 semester). The Bachelor’s degree programmes include a final work, “Diploma Work”, with

a scope of 12 ECTS-points and the Master's degree programmes include a final thesis, "Master's Research Work", with a scope of 24 ECTS-points. The module handbooks in each programme list the average workload in hours in which the students need to complete the module. The university states in their Self-assessment report that the expected workload allows the students to achieve the planned learning outcomes in each module and within the study programme as a whole. The number of awarded ECTS credit points is under regular review by the university considering the student evaluations and discussions during the courses.

Furthermore, AITU describes in its Self-assessment report that "[i]n the trimester concept, 10 teaching weeks and 2 exam weeks are conducted in each trimester. Typical modules cover 5 credits. This is achieved by conducting 10 weeks x 5 h teaching per week = 50 teaching hours per trimester. This is 33% of the total 150 hours which constitute the workload for 5 credits. All curricular activities, including mandatory and elective modules, are awarded with credits. With 80 credits and 30 hours workload per credit the workload per year reaches 2,400 hours. This is leading to approximately 50 hours workload per week which exceeds the recommended workload per week in EU universities. This is possible since students of AITU (and Kazakh students in general) study full time, more than 90% based on scholarships which cover tuition fees and all cost for living and accommodation. Students live in dormitories owned and operated by AITU, covering a lot of the services for daily life. The trimester concept and the high annual workload are distinct features of the AITU strategy and philosophy. Since IT topics are in high demand and the transfer of competences to the labour market has to be very fast, the university considers the study programmes as a fast-track path to the IT industry. This is achieved by the very special and dense organisation of the trimester concept which on the other hand spares students from a of the work they usually would need to do outside their studies. The AITU programmes are explicitly positioned as intensive, fast-track programmes. This is communicated to applicants and students, and it is one of the main reasons why students choose AITU."

During the discussion rounds, the experts discuss with the various stakeholders the high student workload associated with the fast-track approach. It turns out that although all groups recognize that it is a high workload, the students in particular do not complain about it, as they have consciously opted for these fast-track programmes. The students state that they knew in advance that they would be faced with a high workload. Nevertheless, in their opinion, the course can be successfully completed in the designated time. The experts therefore conclude that the workload is appropriate for the approach chosen here. However, they would like to point out that special attention should be paid to the students' workload over the entire course of study when continuously evaluating the degree programmes. This applies in particular to the Master's degree programmes for which there

were no graduates at the time of the audit and the workload of each degree programmes as a whole could not yet be evaluated.

In summary, the expert panel confirms that a credit point systems is used in all study programmes under review to express the students' workload. Credits are awarded for every module based on the respective workload. The estimated workload is realistic and well-founded, so that the study programs can be completed in the standard period of study. The modules of each programme are regularly evaluated to whether the credits awarded for each module correspond to the actual student workload and whether the distribution of the workload across all semesters enables graduation within the standard period of study. Students are involved in these processes by participating in the evaluation at the end of each course.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Self-assessment report
- Module handbook of each degree programme
- Discussions during the audit

Preliminary assessment and analysis of the experts:

In its Self-assessment report, AITU states that "teaching methods include lectures, experiments, assignments, field studies and seminars. The learning model used is student centred learning (SCL), namely cooperative learning (CL) model, problem-based learning (PBL) model, and project-based learning (PjBL). Cooperative learning directs students to use knowledge and understanding to solve authentic problems." The teaching methods used are listed in the module handbooks. The university divides these into "Lecture", "Practical classes", "Seminar forms", "laboratory classes", "Independent work of student (SIS)", "Independent work of student under the guidance of a teacher TSIS)" and "Counselling" and provide definitions for all of those. As the university states in its Self-assessment report, the practical approach of the study programmes should also be reflected in the didactic methods, which is why the teachers are encouraged to "use training methods that are practice-oriented in nature, such as the implementation of research projects, problem-oriented training, science-oriented training, team-oriented training, and others."

During the discussion rounds with teachers and students, the experts were able to confirm that the teaching concept presented is also used in practice and that different forms of teaching are utilised. In summary, the experts can confirm that a variety of learning methods are used and that they are aligned with the intended learning outcomes. In the discussions with students, the experts learn that they are generally satisfied with the quality of

teaching and learning in the programmes under review. Gathering systematic feedback on the quality of teaching and learning can be achieved through the course evaluation survey conducted at the end of each semester, which serves as a valuable source of information.

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

The experts consider criterion 1 to be fulfilled.

2. Exams: System, Concept and Organisation

Criterion 2 Exams: System, Concept and Organisation

Evidence:

- Self-assessment report
- Module handbook of each degree programme
- Sample of examination papers and final theses provided during the audit
- Rules on the assessment system of students of Astana IT University LLP
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The design, organisation and assessment of examinations at AITU follows the “Rules on the assessment system of students of Astana IT University LL”. All assessment methods are designed to individually measure the extent to which students have achieved the respective learning outcomes of the module and the programme. The regulations specify that students must have an attendance rate of at least 70% of the total lectures and practical classes to pass an exam. Furthermore, there are three examinations per module: “Midterm examination” (30% of final grade), “Endterm examination” (30% of final grade), and “Final examination” (40 % of final grade). AITU further defines that “Student must gain 50% of the total mark to pass the course.” In case of failure, students have the chance to retake the final exam.

In all seven degree programmes under review, different kind of examinations forms are being used, such as written or oral exams, quizzes, presentations, seminars, case studies, homework assignments, projects, as well as lab and research work. The respective exam forms of the individual modules are defined in the corresponding module descriptions and syllabi.

During the on-site visit, the experts had access to a selection of exams and final projects and theses respectively. The forms of exams are oriented in-line with the envisaged learning outcomes of the respective courses, and the workload is allocated in an acceptable way. They confirm that these represent an adequate level of knowledge as required by the EQF level 6 for the four Bachelor's degree programmes, the EQF level 7 for the three Master's degree programmes. However, the experts note that some of the existing Master's theses were not written in English and want to know why it is possible not to write a thesis in English given the international orientation of the programmes, including English as the main teaching language. According to the experts, this would also not be in line with the stated learning objectives of the Master's degree programmes under review to be able to communicate in English on an academic level. In response, the programme coordinators explain that, due to national regulations, students with a lower level of English must also be admitted to the Master's programme. Although they would then be supported in achieving an appropriate level of English during their studies, they would still feel more comfortable writing them in Russian or Kazakh. As such a regulation was not submitted, the experts would like to see it in order to confirm this. Regardless of this, however, the experts are of the opinion that English-language Master's programmes must also ensure that final theses are written in English. This is also necessary in order to be able to check whether the associated learning objectives have been achieved.

In conclusion, the experts consider the number of the examinations as adequate. The number and distribution of exams ensure an adequate workload as well as sufficient time for preparation. Furthermore, the experts conclude that the assessment methods are appropriately chosen in all seven degree programmes under review to assess the achievement of module and programme learning outcomes. The criteria for the examinations are clearly presented online and in the module handbooks. Students confirm that they are well informed about the examination schedule, form and rules for grading. Students have an opportunity to consult their lecturers about the results of their exams and arrange a re-assessment of the exam if they consider it necessary. The experts confirm that all study programmes include a final thesis. However, they state that it should be ensured that at least the final theses in the Master's degree programmes are written in English in order to meet their own learning objectives and the international approach chosen.

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

The experts consider criterion 2 not to be fully fulfilled.

3. Resources

Criterion 3.1 Staff and Staff Development
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Evidence:

- Self-assessment report
- Staff handbook
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The teaching staff of the AITU is divided into Full Professors, Associate Professors, Assistant Professors, Senior-lectors, and Teaching assistants. The university sets out binding rules on recruitment, hiring, development and promotion of teaching staff. Furthermore, AITU explains in its Self-assessment report that “Information about the competition and the availability of a vacant position of the teaching staff and researchers is posted on the official website of the university [...], not less than thirty calendar days before the date of interview. The information includes the name of the vacant position and the requirements for experience and qualifications. Consideration of applications for vacant positions is carried out by a Competitive commission from the administrative and managerial staff and teaching staff.” In addition, “[i]n 2021-2022, the University introduced a new KPI system in the qualification requirements for the position of High-research teacher, and research-teacher.” During the on-site discussion, the teaching staff confirms that they are aware of all regulations and that these are transparently accessible.

In its Self-assessment report, AITU provides the following tables on the staff members in the Computer Engineering Department:

Staff	N.	Full-time	Part-time
Department director	1		
Director deputy	1		
Manager	1		
Overall	3		
Full professor	2	1	1
Associate professor	8	6	2
Assistant professor	11	5	6
Senior-lector	38	26	12
Teaching assistant	25	14	11
Overall	84	52	32

In addition to permanent lecturers, the university also engages guest lecturers from the IT industry. AITU states “Professionals who are highly qualified and experienced in the IT industry, such as those employed by Google, Microsoft, Chatfuel and Epam, visit the lessons and share their expertise and knowledge with students. During a particular trimester, other teaching staff may have the opportunity to attend these lessons and observe the visiting professionals. Following the visit, the observing teacher is expected to write a report on their observations. This process allows local teachers to improve their teaching skills by observing and receiving feedback on their teaching philosophy, style, and students' attitude.”

AITU also supports the further development of the teaching staff's qualifications and competencies. In its Self-assessment report, AITU points out that “[i]nstructors participate in various courses, workshops and other events to match with the industrial realities, for example, attending the technological entrepreneurship course conducted by the Corporate Foundation Astana Hub International Technopark for IT Start-ups from (November 2022), "National Agency for the Development of Innovations "QazInnovations" JSC (December 2022).” In addition, the “Dean’s office conducts trainings for teaching staff each academic

year. The following topics are included in seminar: practice lessons related to “Digital University”, LMS Moodle, “Tezis” systems, Development of online and blended courses, course and content development on Open edX, didactics and principles of teaching and learning, Teacher-Centered Approach to Learning vs Student-Centered Approach to Learning, Teacher-Centered teaching methods: Direct Instructions (Low Tech), Flipped Classrooms (High Tech), Kinesthetic Learning (Low Tech), Blended learning and Universal Design for Learning (UDL). The staff of departments get official certificates such as Microsoft, Oracle, Cisco, Amazon, IBM, Huawei vendors according to teaching load and KPI plan. Also, learning courses for teachers are available. For example, there was Blockchain training, which was conducted by Astana Hub and Payment and Financial Technologies Development Center of RK for 14 weeks (3 times a week).” In addition, the university states in its documents and in discussions on site that all teaching staff are supported in acquiring sufficient English skills if this is still necessary. In addition, increasing efforts are being made to recruit international teaching staff in order to further strengthen the international orientation of the AITU.

The experts highly acknowledge the efforts that the university has had to make to recruit sufficient teaching staff in the short time since it was founded. They also see the university continuing to grow and point out that this must continue to be covered by staff and the existing infrastructure. Moreover, they consider it positive that the AITU is trying to recruit many international lecturers. They support this approach and would like to encourage further internationalization. This also applies to further international cooperation at academic and research level and to the recruitment of international students.

Furthermore, the experts note that the proportion of lecturers with a PhD should be further increased. They recognize that AITU is a young university that has grown rapidly in a short period of time and that it already offers support for further education. For example, there are research grants to go abroad, and all senior lecturers have the opportunity to enrol in AITU’s PhD programme and receive funding for this. The experts believe that this should be further encouraged in order to increase the academic level of the individual degree programmes and in particular the final theses in the medium term. Therefore, they recommend to continue the further development of the teaching staff and to increase the share of PhD holders.

In addition, the experts recognize that lecturers have to carry a quite high workload. This is also due to the rapid growth of the university as well as the criteria for the academic and personal development of lecturers, which are measured using KPIs. During the discussion round with the lecturers, the experts learned that the number of teaching hours differs depending on whether you hold a teaching position or a research position. The number of teaching hours per week can vary between 10 and 25 hours. However, during the on-site

discussions, the lecturers stated that there are transparent rules on this and that it is possible in principle to switch from a teaching position to a research position. The experts acknowledge that teachers do not complain about an excessive workload and state that clear rules are in place. Nevertheless, the experts believe that further growth of the university could lead to an even higher workload if additional positions are not filled at the same pace. Therefore, they recommend paying more attention to ensuring that the teachers' workload is not too high.

In summary, the experts have a positive impression of the composition, professional orientation, and qualifications of the teaching staff in all seven degree programmes under review. Its qualification ensures a successful teaching. Lecturers have the opportunity to further develop their professional and didactic skills and are supported in using corresponding offers. The experts reviewed the evaluations and acknowledge that the didactic skills of the lecturer are regularly reviewed. All interviewed staff demonstrate high motivation and attachment to the institution.

In addition, the expert group notes approvingly 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 members of the teaching staff are available on any issues regarding the degree programmes and offer advice on particular modules. This is also confirmed by the students during the discussions on-site.

Criterion 3.2 Funds and equipment

Evidence:

- Self-assessment report
- Tour of the programmes' facilities
- Discussions during the audit

Preliminary assessment and analysis of the experts:

In its Self-assessment report, AITU describes its funding and infrastructure as follows: "The funding of Astana IT University (AITU) is mainly based on tuition fees of students. Between 90-95% of the students receive a national scholarship which covers the tuition fees and the cost of living, including accommodation in the university dormitories. A minority of students joins AITU based on own funds. Due to the scholarship system, students do not work in side-line jobs. In addition, they use the serviced accommodation in the dormitories and the catering on campus. This allows students to focus on their studies which in return makes the trimester systems feasible. The number and funding amount of the national

scholarships is assigned to AITU on an annual basis. This allows a quite precise planning of the yearly intake of students and of the budget of the university. The main investment budget is assigned to AITU by the Nursultan Nazarbayev Education Fund (NNEF), the main shareholder of the university.”

“The infrastructure of Astana IT University is a single educational and scientific complex and includes 1 academic building, 3 dormitories for students and 2 houses for teaching staff and employees. AITU is located on the Expo 2017 campus, [...] which today hosts a technology museum, an innovation centre and incubator, and a free trade zone for international companies. Facilities for events and conferences complement the Expo campus. The total area of the educational building of AITU is 37.6 thousand sqm., including useful area - 28.3 thousand sqm., of which educational – 18 thousand sqm. Dormitories (3 buildings) of the university are designed for 734 beds. The university has modern educational laboratories, such as Cisco Lab, Huawei Lab, Kaspersky Lab, FabLab, 8 lecture halls, 27 classrooms, 37 computer classes, 17 educational and 4 specialized laboratories, a modern assembly hall with 450 seats, a reading room in the library for 250 seats, sports and fitness halls. The “vendor labs” of Cisco, Huawei and Kaspersky are equipped and operated in cooperation with the vendors which allows to train students and professionals and to grant professional certificates. For students at the university, conditions have been created for conducting research activities within the Science and Innovation activities of the university, mainly based on scientific research and innovation enters, focussing on AgroTech, EdTech and Industry 4.0. All classrooms are equipped with interactive projectors, computers and audio-video systems. There is a modern Media Center with an innovative TV and radio broadcasting studio. The university has a health center equipped with modern equipment and staffed by leading medical specialists, there is a student canteen for 250 seats. The university has a corporate computer network. It includes all departments, departments, services and educational units, work is underway to develop electronic document management. There are 250 Wi-Fi points with free Internet access on the territory of the university. Improvement of material, technical and information resources are planned and defined in the Development Strategy of Astana IT University LLP for 2020-2025.”

Furthermore, the university describes that “AITU uses the EBSCO service for scientific libraries, which include the following resources:

Computers & Applied Sciences Complete	2316= (Academic Journal, Magazine, Conference Proceedings Collection, Book / Monograph, Conference Papers Collection, Pamphlet, Trade Publication, Report, Newspaper)
Applied Science & Technology Source Ultimate	5127 = (Academic Journal, Magazine, Conference Proceedings Collection, Book / Monograph, Conference Papers Collection, Pamphlet, Trade Publication, Report, Newspaper)
Communications and Mass Media Complete	Book / Monograph, Academic Journal, Magazine, Conference Proceedings Collection: 1042
Academic Search Complete	17986 = Total number of journals & magazines indexed and abstracted (15926 are peer-reviewed) 8913 = Total number of journals & magazines in full text (7676 are peer-reviewed)
ITCore eBook collection	3829= (Academic Journal, Magazine, Conference Proceedings Collection, Book / Monograph, Conference Papers Collection, Pamphlet, Trade Publication, Report, Newspaper)
University Press eBook Collection	37406= (Academic Journal, Magazine, Conference Proceedings Collection, Book / Monograph, Conference Papers Collection, Pamphlet, Trade Publication, Report, Newspaper)
Business eBook Collection	20805= (Academic Journal, Magazine, Conference Proceedings Collection, Book / Monograph, Conference Papers Collection, Pamphlet, Trade Publication, Report, Newspaper)
Education eBook Collection	4558= (Academic Journal, Magazine, Conference Proceedings Collection, Book / Monograph, Conference Papers Collection, Pamphlet, Trade Publication, Report , Newspaper)
Psychology eBook Collection	654= (Academic Journal, Magazine, Conference Proceedings Collection, Book / Monograph, Conference Papers Collection, Pamphlet, Trade Publication Report, Newspaper)”

The expert panel considers the financial resources and the available equipment constitute a sustainable basis for delivering the degree programmes. During the on-site audit, they visit the AITU’s facilities including lecture halls, the library, and several laboratories. The

experts highlight that AITU has very well equipped laboratories and outstanding facilities. The laboratories contain modern equipment, which allows the students to gain extensive practical experience during their studies. However, the experts also want to point out that the university must continue to maintain the expansion of the infrastructure in order to maintain the high quality of the facilities as student numbers continue to rise.

Summing up, the experts confirm that the financial resources and the available equipment at AITU are suitable to operate all seven study programmes under review. This includes a secure funding and reliable financial planning, sufficient infrastructure in terms of both quantity and quality as well as binding regulation of internal and external cooperations.

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

The experts consider criterion 3 to be fulfilled.

4. Transparency and Documentation

Criterion 4.1 Module Descriptions

Evidence:

- Self-assessment report
- Module descriptions of each degree programme
- Webpage of each degree programme
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The module handbooks for all seven degree programmes under review are published on the university's website and are thus accessible to the students as well as to all stakeholders. The experts observe that they mostly contain the necessary information about the persons responsible for each module, the teaching methods, the credit points awarded, the intended learning outcomes, the applicability and the forms of assessment, module title, person(s) responsible for each module, teaching method(s), credits and work load, intended learning outcomes, module content, admission and examination requirements, form(s) of exams and details explaining how the module mark is calculated, recommended literature. However, there are still some minor shortcomings in individual module handbooks. This means that the module description for the final "Diploma work" is missing for all four Bachelor's degree programmes under review. In addition, the module description

of the final “Master's Research Work” in the Master's degree programme Applied Data Analytics is not fully complete, as the correct information on the workload and the assigned ECTS points is missing.

Therefore, the experts agree that the module descriptions of all four Bachelor's degree programmes and of the Master's degree programme Applied Data Analytics need to be revised and completed.

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Self-assessment report
- Sample Transcripts of record
- Sample Diploma Supplements
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The experts confirm that the students of all seven degree programmes under review are awarded a Diploma and a Diploma Supplement after graduation. The Diploma consists of a Diploma Certificate and a Transcript of Records. The Transcript of Records lists all courses that the graduate has completed, the achieved credit points, grades, and cumulative GPA. The Diploma Supplements contain all necessary information about the degree programmes.

Criterion 4.3 Relevant Rules

Evidence:

- Self-assessment report
- Academic regulations
- AITU webpage
- Webpage of each degree programme
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The auditors confirm that the rights and duties of both AITU and the students are clearly defined and binding. All rules and regulations are transparently accessible and the students

receive the relevant course material at the beginning of each semester. This includes a syllabus, which contains more detailed information about the course's content, the exams and the exam schedule than the module descriptions.

In addition, all relevant information about the degree programmes (e.g., module handbook, study plan, intended learning outcomes) is available on the English homepages of the programmes.

However, after reviewing the documents and the discussions on site, the experts found that there are no regulations to compensate for disadvantages for students, e.g. to ensure individually adapted regulations for taking exams if necessary. The experts are therefore in favour of AITU introducing regulations on disadvantage compensation.

In addition, the experts discuss the use of AI tools in examinations and especially written assignments and projects and want to know whether the university has already introduced regulations on the use of these tools. This was denied by the programme coordinators. As the use of AI tools has become very relevant in the meantime, the experts recommend that the university should deal intensively with this topic and establish corresponding regulations.

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

The experts consider criterion 4 not to be fully fulfilled.

5. Quality management: quality assessment and development

Criterion 5 Quality management: quality assessment and development

Evidence:

- Self-assessment report
- Quality Assurance Policy – Astana IT University
- Study Statistics
- Evaluation Samples
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The experts discuss the quality management system at AITU with representatives from the rectorate, the programme coordinators, the students, and the teaching staff. They learn that AITU has an extensive quality management system, which is aimed at constantly improving the quality of the degree programmes and the experience of students and department members. The university has established regulations, processes and standards regarding quality assurance in its “Quality Assurance Policy – Astana IT University”, which is accessible to all stakeholders via the university’s website. The individual departments and programmes are obliged to follow this regulations and carry out self-assessment tasks such as the revision of the curricula. Therefore, surveys are conducted among students, teaching staff, alumni and external stakeholders such as potential employers.

In its Self-assessment report, AITU reports that “[e]valuation based on surveys is used to monitor the learning progress and the student’s satisfaction on a regular basis. Evaluation surveys are conducted within the regular trimester schedule of the modules. In addition, surveys are launched on specific topics whenever needed. For the surveys, MS Forms, google and other tools are used. The survey is published via a number of channels, including WhatsApp for quick surveys on specific topics. The surveys include feedback about the workload. This is also discussed in all-hands meetings with the students and during the lectures by each individual lecturer.” During the on-site discussion rounds, the students state that those in charge are always eager and open for feedback aside from the official evaluations and that students have the impression that their comments are taken into consideration with regard to the further improvement of the programmes. This becomes apparent in the constant curricular revision process that is performed under participation of students and industry partners. The experts are glad to hear that students are satisfied with the programmes and included in the feedback loop.

In its Self-assessment report, AITU presents figures showing that around 75% of AITU students take part in the surveys and that they have quite high satisfaction rates with regard to the five categories “teaching methodology”, “quality of educational material”, “objectivity of assessment”, “quality of feedback”, and the “quality of communication”. All these categories above gain a “satisfaction rate” of 88-89%. The experts are of the opinion that these are very high rates, but cannot identify any systemic error in the collection of the data. During the on-site discussions, the students also indicated a high level of satisfaction with the university, the programs and the individual lecturers, so that the experts consider the figures to be credible. Nevertheless, they would like to know what is planned in the event of poor evaluation results. In response, the university officials explain that if the satisfaction rate is below 80%, the results are discussed with the department directors and any necessary changes are debated. If poor evaluations become more frequent, there is always the solution of dismissing a lecturer in the end. However, those responsible emphasize that this requires more than one poor evaluation. There is also a policy of “peer to peer reviews”. This means that teachers occasionally go into another teacher's class, observe the lesson and then discuss their impressions with the teacher carrying out the course.

AITU also regularly consults the industry for the assessment and development of the programmes. In extensive surveys, companies are asked among other things about changes in the labour market, expected qualifications of the graduates, and their satisfaction with interns and graduates from AITU. The involvement of external stakeholders is also systematically ensured, as industry representatives, are members of the academic committees who, together with the programme directors, are primarily responsible for the development and further development of the curricula. In the audit discussions, the industry partners report to be satisfied with the students from AITU and emphasize their high level of soft skills, e.g. in terms of communication, especially in comparison to graduates from other universities. Furthermore, the industry partners confirm that their suggestions are generally adopted by AITU. The experts appreciate that AITU has a close relationship with the industry partners and regularly collects feedback from them. Thus, the experts agree that the quality management circles at AITU are well established and work under participation of all stakeholders.

In summary, the experts are satisfied with the quality management system at AITU, especially with the continuous feedback loops and the involvement of important stakeholder groups such as students, alumni and representatives from the industry.

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

The experts consider criterion 5 to be fulfilled.

D Summary: Expert recommendations

The experts 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 Computer Science	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ba Software Engineering	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ba Big Data Analysis	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ba IT Management	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ma Computer Science and Engineering	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ma Applied Data Analytics	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ma Project Management	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029

Requirements

For all programmes

A 1. (ASIIN 4.3) Introduce regulations on disadvantage compensation.

For all Bachelor's programmes and the Master's programme Applied Data Analytics

A 2. (ASIIN 4.1) Review and complete the module handbooks and make them accessible to all stakeholders.

For all Master's programmes

A 3. (ASIIN 2) Ensure that the final theses are written in English.

Recommendations

For all programmes

- E 1. (ASIIN 1.3) It is recommended to ensure that most of the practical parts are carried out with synchronous supervision by a teacher.
- E 2. (ASIIN 1.3) It is recommended to use one programming language for a longer period than only one trimester in order to enable a deeper understanding of at least one programming language.
- E 3. (ASIIN 1.3) It is recommended to increase the number of courses covering digital transformation, entrepreneurship and artificial Intelligence.
- E 4. (ASIIN 1.3) It is recommended to introduce more specializations and elective courses. Consider introducing minors and ensure that there are at least two options to choose from in each "elective slot".
- E 5. (ASIIN 3.1) It is recommended to continue the further development of teaching staff and to increase the share of PhD holders.
- E 6. (ASIIN 3.1) It is recommended that the workload of teaching staff be monitored so that it does not exceed or is optimally reduced.
- E 7. (ASIIN 3.2) It is recommended to continue the expansion of the infrastructure.
- E 8. (ASIIN 4.3) It is recommended to establish regulations regarding the use of AI tools.

For all Bachelor's programmes

E 9. (ASIIN 1.3) It is recommended to raise the level required to skip the English language course in the first year of study to B2.

Ma Project Management

E 10. (ASIIN 1.3) It is recommended to look after redundancies regarding project management contents.

E Comment of the Technical Committees

Technical Committee 07 – Business Informatics/Information Systems

Assessment and analysis for the award of the ASIIN seal:

The TC discusses the procedure and follows the experts' assessment without any changes.

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 07 – Business Informatics/Information Systems recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation*
Ba IT Management	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ma Project Management	With requirements for one year	30.09.2029	–	–

Technical Committee 04 – Informatics/Computer Science

Assessment and analysis for the award of the ASIIN seal:

The TC discusses the procedure and follows the experts' assessment without any changes.

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 Computer Science	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ba Software Engineering	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ba Big Data Analysis	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ma Computer Science and Engineering	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ma Applied Data Analytics	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029

F Decision of the Accreditation Commission

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

The TC discusses the procedure and agrees on an editorial change to recommendation E10. Apart from this, the TC follows the assessment of the experts and the technical committees without any changes.

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

The Accreditation Commission 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 Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Computer Science	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ba Software Engineering	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ba Big Data Analysis	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ba IT Management	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ma Computer Science and Engineering	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ma Applied Data Analytics	With requirements for one year	30.09.2029	Euro-Inf®	30.09.2029
Ma Project Management	With requirements for one year	30.09.2029	–	30.09.2029

Requirements

For all programmes

A 1. (ASIIN 4.3) Introduce regulations on disadvantage compensation.

For all Bachelor's programmes and the Master's programme Applied Data Analytics

A 2. (ASIIN 4.1) Review and complete the module handbooks and make them accessible to all stakeholders.

For all Master's programmes

A 3. (ASIIN 2) Ensure that the final theses are written in English.

Recommendations

For all programmes

E 1. (ASIIN 1.3) It is recommended to ensure that most of the practical parts are carried out with synchronous supervision by a teacher.

E 2. (ASIIN 1.3) It is recommended to use one programming language for a longer period than only one trimester in order to enable a deeper understanding of at least one programming language.

E 3. (ASIIN 1.3) It is recommended to increase the number of courses covering digital transformation, entrepreneurship and artificial Intelligence.

E 4. (ASIIN 1.3) It is recommended to introduce more specializations and elective courses. Consider introducing minors and ensure that there are at least two options to choose from in each "elective slot".

E 5. (ASIIN 3.1) It is recommended to continue the further development of teaching staff and to increase the share of PhD holders.

E 6. (ASIIN 3.1) It is recommended that the workload of teaching staff be monitored so that it does not exceed or is optimally reduced.

E 7. (ASIIN 3.2) It is recommended to continue the expansion of the infrastructure.

E 8. (ASIIN 4.3) It is recommended to establish regulations regarding the use of AI tools.

For all Bachelor's programmes

E 9. (ASIIN 1.3) It is recommended to raise the level required to skip the English language course in the first year of study to B2.

Ma Project Management

E 10. (ASIIN 1.3) It is recommended to identify and eliminate unnecessary redundancies regarding project management contents.

Appendix: Programme Learning Outcomes and Curricula

According to the programme's website the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Computer Science:

“EO1. Implement basic network communication between devices, calculate and apply addressing schemes, set up and configure network devices required to ensure the functionality of information and communication technologies.

EO2. Apply practical skills in working with information and communication systems and explain the general methodological foundations for deploying and maintaining systems at various levels of computer systems architecture and software, including low-level programming and microcontroller programming.

EO3. Apply domestic and foreign standards for software development and ensuring the operation of information and communication systems in various organizations, including the principles of constructing algorithms.

EO4. Apply mathematical tools for analyzing software systems and data based on statistical and probabilistic models.

EO5. Independently analyze modern sources, draw conclusions, argue them, make decisions based on information and apply the features of academic vocabulary.

EO6. Explain and understand the regulatory framework, including documents, standardization and certification procedures in the development of information and communication technologies.

EO7. Apply project management tools at various stages of the project life cycle, make a qualitative and quantitative assessment of project risks, determine the effectiveness of the project.

EO8. Develop secure server-side client web applications and mobile applications.

EO9. Demonstrate knowledge of the architecture of computer systems and the basic principles of programming, manage operating systems.

EO10. Apply technical tools and software services to ensure the continuity of the process of developing software systems and entrepreneurship.”

The following **curriculum** is presented:

0 Appendix: Programme Learning Outcomes and Curricula

Computer Science 2021									
Term 1			Term 2			Term 3			
Foreign Language 1 (English)	5	year 1	Foreign Language 2 (English)	5	Professional English	5			
Modern History of Kazakhstan	5		Cultural studies	2					
Linear Algebra	5		Discrete Mathematics	5	Calculus 1	5			
Information and Communication Technologies	5		Web Technologies 1 (Front End)	5	Web Technologies 2 (Back End)	5			
Introduction to Programming (C++) // Introduction to Programming (Python)	5		Object-Oriented Programming (Java) // Object-Oriented Programming (Python)	5	Coding Lab // Innovation Lab	5			
					Algorithms and Data Structures	5			
Physical Culture	2		Physical Culture	2	Physical Culture	2			p.a.
Educational Practice	2								
	credits 29			credits 24		credits 27			80
Term 4		year 2	Term 5			Term 6			
Sociology	2		Kazakh (Russian) Language 2	5					
Political Science	2		Computational Mathematics	5	Probability and Statistics	5			
Calculus 2	5		Operating System Concepts	5	Computer Networks	5			
Kazakh (Russian) Language 1	5		Computer Organisation and Architecture	5	Capstone Project // Research Project	5			
Database Management Systems	5		Advanced Databases (NoSQL) // Storage Systems	5	Software Quality Assurance // Software Architecture	5			
Analytic methods in Computer Science // Design and Analysis of Algorithms	5		Advanced Programming	5	Industrial practice (between 6 and 7)	4			p.a.
Physical Culture	2								
	credits 26		credits 30		credits 24			80	
Term 7		year 3	Term 8			Term 9			
Psychology	2		Philosophy	5	Diploma Work (Project) and Defence	12			
Blockchain Technologies	5		Cloud computing	5	Undergraduate practice	4			
Technological Entrepreneurship	5		Project Management	4	Industrial practice	8			
Academic writing	5		Research Methods and Tools	5					
Machine Learning Algorithms	5		Distributing computing	5					
Data Visualization // Computer Graphics Fundamentals	5		Information Security Fundamentals // IT Risk Management	5					p.a.
	credits 27		credits 29					80	
								total credits 240	

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

“EO1. Apply domestic and foreign standards for software development in organizations.

EO2. Apply mathematical tools for analyzing software systems and data based on statistical and probabilistic models, build algorithms for solving problems.

EO3. Apply practical programming skills and explain the general methodological foundations of program development, compile system programs for various levels of computer

system architecture and software, including programming at the lower level and programming microcontrollers.

EO4. Apply technical means and software services to ensure the continuity of the software system development process.

EO5. Demonstrate knowledge about the architecture of computer systems, manage operating systems.

EO6. Independently analyze modern sources, draw conclusions, argue them, make decisions based on the information and apply the features of academic vocabulary.

EO7. Apply project management tools at various stages of the project life cycle, perform qualitative and quantitative risk assessment of projects, determine the effectiveness of the project.

EO8. Implement basic network communication between devices, calculate and apply addressing schemes, configure and configure network devices required to ensure the functionality of information and communication technologies.

EO9. Develop secure server client web applications and mobile applications.

EO10. Explain and understand the regulatory framework, including documents, standardization and certification procedures in the field of information and communication technology development and entrepreneurship.”

The following **curriculum** is presented:

0 Appendix: Programme Learning Outcomes and Curricula

Software Engineering 2021									
Term 1				Term 2			Term 3		
Foreign Language 1 (English)	5	year 1	Foreign Language 2 (English)	5	Professional English	5			
Cultural Studies	2		Modern History of Kazakhstan	5					
Linear Algebra	5		Discrete Mathematics	5	Calculus 1	5			
Information and Communication Technologies	5		Web Technologies 1 (Front End)	5	Web Technologies 2 (Back End)	5			
Introduction to Programming (C++) // Introduction to Programming (Python)	5		Object-Oriented Programming (Java) // Object-Oriented Programming (Python)	5	Coding Lab // Innovation Lab	5			
					Algorithms and Data Structures	5			
Physical Culture	2		Physical Culture	2	Physical Culture	2	p.a.		
Educational Practice	2			credits 27		credits 27			80
	credits 26								
Term 4			Term 5			Term 6			
Kazakh (Russian) Language 1	5	year 2	Kazakh (Russian) Language 2	5	Psychology	2			
			Political Science	2					
Calculus 2	5		Computational Mathematics	5	Probability and Statistics	5			
Analytic methods in Computer Science // Design and Analysis of Algorithms	5		Computer Organisation and Architecture	5	Operating Systems	5			
Database Management Systems	5		Advanced Databases (NoSQL) // Storage Systems	5	Computer Networks	5			
Software Design Patterns	5		Advanced Programming 1 // Native Mobile Development	5	Advanced Programming 2 // Cross-platform mobile development	5			
Physical Culture	2			credits 27	Industrial practice (between 6 and 7)	4	p.a.		
	credits 27					credits 26		80	
Term 7			Term 8			Term 9			
Sociology	2	year 3	Philosophy	5	Diploma Work (Project) and Defence	12			
Software Architecture	5		Capstone Project	5	Undergraduate practice	4			
Project Management	4		Information Security Fundamentals	5	Industrial practice	8			
Research Methods and Tools	5		Cloud Computing	5		credits 24			
Machine Learning Algorithms // Computer Vision	5		Technological Entrepreneurship	5					
Software Quality Assurance and Testing	5		Academic writing	5				p.a.	
	credits 26			credits 30				80	
							total credits 240		

According to the programme's website the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Big Data Analysis:

“LO1. Explain and understand the regulatory framework, including documents, standardization and certification procedures in the development of information and communication technologies.

LO2. Apply domestic and foreign standards for software development in organizations.

LO3. Apply practical programming skills and explain the general methodological foundations of program development, create system programs for various levels of computer systems and software architecture, including low-level programming and microcontroller programming.

LO4. Demonstrate knowledge of the architecture of computer systems, manage operating systems.

LO5. Implement basic network communication between devices, calculate and apply addressing schemes, configure and configure network devices required to ensure the functionality of information and communication technologies.

LO6. Apply project management tools at various stages of the project life cycle, make a qualitative and quantitative assessment of project risks, determine the effectiveness of the project.

LO7. Apply mathematical tools to analyze software systems and data based on statistical and probabilistic models.

LO8. Apply hardware and software services to ensure the continuity of the process of developing software systems.

LO9. Independently analyze modern sources, draw conclusions, argue them and make decisions based on information.

LO10. Develop secure server-side web client applications and mobile applications.”

The following **curriculum** is presented:

0 Appendix: Programme Learning Outcomes and Curricula

Big Data 2021									
Term 1		year 1	Term 2		Term 3				
Foreign Language 1 (English)	5		Foreign Language 2 (English)	5	Professional English	5			
Modern History of Kazakhstan	5		Cultural Studies	2					
Linear Algebra	5		Discrete Mathematics	5	Calculus 1	5			
Information and Communication Technologies	5		Web Technologies 1 (Front End)	5	Web Technologies 2 (Back End)	5			
Introduction to Programming (C++) // Introduction to Programming (Python)	5		Object-Oriented Programming (Java) // Object-Oriented Programming (Python)	5	Coding Lab // Innovation Lab	5			
					Algorithms and Data Structures	5			
Physical Culture	2		Physical Culture	2	Physical Culture	2			
Educational Practice	2			credits	24		credits	27	p.a.
	credits		29						80
Term 4		year 2	Term 5		Term 6				
Kazakh (Russian) Language 1	5		Kazakh (Russian) Language 2	5	Sociology	2			
			Political Science	2					
Calculus 2	5		Computational Mathematics	5	Probability and Statistics	5			
Computer Organisation and Architecture	5		Operating Systems and Computer Networks	5					
Database Management Systems	5				Advanced Databases (NoSQL) // Storage Systems	5			
Analytic methods in Computer Science // Design and Analysis of Algorithms	5		Statistics and Data Science 1 (Python)	5	Statistics and Data Science 2 (Python)	5			
Physical Culture	2		Advanced Programming // Native Mobile Development	5	Capstone Project // Research Project	5			
	credits	27		credits	27		Industrial practice (between 6 and 7)	4	p.a.
						credits	26	80	
Term 7		year 3	Term 8		Term 9				
Philosophy	5		Psychology	2	Diploma Work (Project) and Defence	12			
Technological Entrepreneurship/Entrepreneur	5		Project Management	4	Undergraduate practice	4			
Academic writing	5		Research Methods and Tools	5	Industrial practice	8			
High Performance Computing // Business Intelligence	5		Information Security Fundamentals // IT Risk Management	5			credits	24	
Big Data and Distributed Algorithms	5		Cloud Computing // Real-Time Operating Systems	5					
Applied Machine Learning	5		Deep and Reinforcement Learning	5					
	credits	30		credits	26			p.a.	
								80	
							total credits	240	

According to the programme's website the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme IT Management:

"R 1 Know the theoretical foundations of information technology, the basics of developing websites, software, object-oriented programming; issues of interaction between man and computer; project management software development and software developers management; be able to determine an innovative solution; plan IT projects; formulate business requirements; have skills in problem solving, professional communication and behavior, design design; creating a healthy working environment for software developers

R 2 To be able to choose, justify and apply various mathematical and statistical methods for solving control problems; use a systematic approach to the process of quantitative analysis of information for making management decisions; owns the skills of statistical analysis of information when making management decisions, building probabilistic-statistical models by adapting them to specific management tasks, the skills of formatting the results of information-analytical work

R 3 To be able to independently analyze the processes and phenomena occurring in modern society; correctly and reasonably formulate their thoughts in oral and written form; use the acquired knowledge in specific situations; own alternative, new and / or innovative approaches to solving professional problems

R 4 To be able to correctly determine the essence and content of management processes, leadership, entrepreneurship and management; to analyze the internal and external environment of the management object, social and psychological factors; establish communication processes, decision making; owns a choice of an effective style of leadership and leadership, methods of managing groups, conflicts, stresses; organization of communications and interaction at enterprises; use of models and methods for rational problem solving; skills of quantitative and qualitative analysis of information in making managerial decisions, building economic, financial and organizational and managerial models

R 5 Own methods of financial management for valuing assets, making investment decisions of a project, financing decisions, methods of analysis and reducing the degree of financial risks; tools for evaluating the effectiveness of investment projects; skills of forming financial plans.

R 6 The ability to critically analyze the current problems of IT management, set tasks and develop a research program, choose the appropriate methods for solving experimental and theoretical problems, interpret, present and apply the results

R 7 Proficient in Kazakh / Russian and a foreign language at a level that allows the implementation of the main types of speech activity; in various ways of oral and written communication; adequate response skills in situations of everyday, academic and professional communication.

R 8 The ability to organize the work of the project team to achieve the goal, find and make managerial decisions, evaluate the quality and effectiveness of labor, costs and results of the team.

R 9 Be able to apply terminology, vocabulary and the main categories of the theory of entrepreneurship and economics; apply entrepreneurial approaches, concepts and methods to your own business idea; to develop a strategy and tactics of the enterprise; use staff motivation methods and different leadership styles; make decisions in the field of attracting customers and investors, organization of labor and the production process; planning and use of resources and the formation of business results; negotiation; creating a project team; drawing up a business plan.

R 10 Be able to analyze and make suggestions on the formation and improvement of marketing services; substantiate proposals for the formation of commodity, pricing, marketing and communication policies of innovative companies; owns the skills of conducting marketing research in the market of high-tech products, their promotion.”

The following **curriculum** is presented:

0 Appendix: Programme Learning Outcomes and Curricula

IT Management 2021									
Term 1					Term 2			Term 3	
Foreign Language (English 1)	5	year 1	Foreign Language (English 2)	5	Professional English	5			
			Cultural studies	2	Modern History of Kazakhstan	5			
Linear Algebra	5		Discrete Mathematics	5	Calculus 1	5			
Information and Communication Technologies	5		Introduction to Programming (C++) // Introduction to Programming (Python)	6	Web Technologies 1 (Front End)	5			
Business Administration	5		Management & Organisation	5	Business Project (Simulation)	5			
			Micro and Macroeconomics	5					
Physical Culture	2		Physical Culture	2	Physical Culture	2			
Educational Practice	2								
	credits 24			credits 30		credits 27		p.a. 81	
Term 4			Term 5			Term 6			
Kazakh (Russian) Language 1	5	year 2	Kazakh (Russian) Language 2	5	Probability and Statistics	5			
Psychology	2		Operating Systems and Computer Networks	5	Quality Management	5			
Political science	2		Business Process Engineering	5	IT Operations Management	5			
Computer Organisation and Architecture	5		Database Management Systems	5	Software Test Management // Change Management	5			
Accounting & Financial Management	5		Native Mobile Developing	5	Industrial Practice (between 6 and 7)	4			
Enterprise IT Architecture	5		Project Management	4					
Physical Culture	2								
	credits 26				credits 29		credits 24		p.a. 79
Term 7			Term 8			Term 9			
Sociology	2	year 3	Philosophy	5	Diploma Work (Project) and Defence	12			
Technological Entrepreneurship / Entrepreneurship	5		Mastering Design Thinking	5	Undergraduate Practice	4			
Business Analysis	5		Business Relationship Management	5	Industrial Practice	8			
Academic Writing	5		Research Methods and Tools	5			credits 24		
Business Intelligence	5		Information Security Fundamentals// IT Risk Management	5					
Agile Management in Virtual Environments // IT Governance and Audit	5		Presentation, Communication & Negotiation	4					p.a.
	credits 27				credits 29				80
							total credits	240	

According to the programme's website the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Computer Science and Engineering:

“PO1. Formulate and solve problems that arise in the course of research activities that require in-depth professional knowledge;

PO2. Choose the necessary approaches and research methods, modify existing ones and develop new ones, based on the objectives of a particular study;

PO3. Apply methodological and methodological knowledge in conducting scientific research, pedagogical and educational work;

PO4. Apply psychological methods and means to improve the efficiency and quality of education in the learning process;

PO5. Know a foreign language at a professional level, allowing you to conduct scientific research and teach special disciplines in universities;

PO6. Model and design complex software systems;

PO7. Lead a team in the software development process;

PO8. Choose standards, methods, technologies, tools and technical means for carrying out work on the design, maintenance and development of software systems.”

The following **curriculum** is presented:

0 Appendix: Programme Learning Outcomes and Curricula

Computer Science and Engineering 2021						
Term 1 (trimester = 10 wks)			Term 2		Term 3	
Foreign language (professional)	4	year 1				
History and philosophy of science	4					
Psychology of management	4					
Higher Education Pedagogy	4		Teaching Practice	4		
Advanced Databases	5		Site Reliability Engineering	4	Software Development Case Study	4
credits	21		Product management	4	Project Management	4
					Advanced Frontend	4
					Advanced QA	4
			Fault tolerance and reliability // Software design patterns	5	Applied Software Development Project	4
			Advanced Software Architecture // Data Driven Decision Making	5	Product security // Information security	5
		Master's research work	6	Master's research work	4	p.a.
		credits	28	credits	29	78
Term 4 (semester = 15 wks)		year 2	Term 5			
Research Practice	16		Master Thesis	10		
Master's research work	4		Preparation and defense of a master's thesis	12		
credits	20		credits	22		42
					total credits	120

According to the programme's website the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Applied Data Analytics:

“LO1. Formulate and solve problems arising in the course of research activities that require in-depth professional knowledge.

LO2. Choose the necessary research approaches and methods, modify existing ones and develop new ones based on the tasks of a specific study.

LO3. Apply methodological and methodological knowledge in conducting scientific research, pedagogical and educational work.

LO4. Apply psychological methods and tools to improve the effectiveness and quality of training in the learning process.

LO5. Speak a foreign language at a professional level that allows you to conduct research and teach special subjects in universities.

LO6. Model and design complex software systems.

LO7. Apply qualitative and quantitative methods and techniques to develop effective solutions to problems.

0 Appendix: Programme Learning Outcomes and Curricula

LO8. Analyze and design software systems for data analysis.

LO9. Manage the team in the process of developing a software system in data analysis projects.

LO10. Choose standards, methods, technologies, tools, and technical means for conducting maintenance of software systems for data analysis.

LO11. Apply methods of design and development of software systems for solving a wide class of applied problems in the field of analysis in various fields.

LO12. Program and test data analysis systems. Participate in the creation and management of information systems for data analysis at all stages of the lifecycle.

LO13. Create relational and non-relational databases for efficient storage and management of data from various large organizations and government agencies.

LO14. Apply data analysis methods for solving problems in various applications for data analysis and analytical processing.

LO15. Create models for analyzing structured and semi-structured data.

LO16. Develop programs and applications for analytical processing of structured and semi-structured data of large volumes.”

The following **curriculum** is presented:

Applied Data Analytics 2021										
Term 1 (trimester = 10 wks)				Term 2			Term 3			
Foreign language (professional)	4	year 1								
History and philosophy of science	4									
Psychology of management	4									
Higher Education Pedagogy	4		Teaching Practice	4						
Mathematics for data science	5		Methods and tools for data analysis	5	Machine learning and artificial intelligence	4				
Programming for data analysis and databases	5		Case study on Data Analytics	5	Data Analytics application project	4				
credits	26		Business process analysis	5	Data processing and understanding//Making decisions based on data	5				
			Business analytics//Digital Finance//Digital business ecosystem	5	Product management// Industry 4.0//Information security	5				
			Master's research work	6	Master's research work	4			p.a.	
			credits	30	credits	22			78	
Term 4 (semester = 15 wks)			Term 5							
Research Practice	16	year 2	Master Thesis	10						
Master's research work	4		Preparation and defense of a master's thesis	12					p.a.	
credits	20	credits	22					42		
								total credits	120	

According to the programme's website the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Project Management:

“LO1: knows the role of historical, philosophical and spiritual processes in modern society, approaches to solving problems arising in the course of research activities.

LO2: knows a foreign language at the required academic level to obtain professional information and sufficient communication skills for interpersonal communication using general, business and professional vocabulary for special economic purposes, business meetings and negotiations, project management at the national and international level.

LO3: applies the main provisions, methodology and didactics, designs and organizes the pedagogical process at the university using modern educational and communication technologies based on interdisciplinary and problem-oriented learning.

LO4: applies the main provisions of the psychological laws of management, the specifics of socio-psychological knowledge use and the socio-psychological principle analysis that underlie effective management.

LO5: owns the methods, principles and culture of modern management of innovative projects and business operations; flexible approaches and tools of business models in project management; organizational and managerial decisions and organizational transformations in the process of project management.

LO6: uses the tools and methods of project management, procedures for structuring a project, developing a project estimate, managing time and cost of a project, monitoring the project progress, calculating a project schedule.

LO7: owns the basics of program and project portfolio management.

LO8: applies tools of business analytics, research and analysis of business models and products in order to rationalize business administration of innovative projects.

LO9: carries out project diagnostics and evaluation.

LO10: uses software products to perform project management tasks using modern approaches in the use of information technology systems integrated into project management.

LO11: possesses the skills of project team management and development.”

The following **curriculum** is presented:

0 Appendix: Programme Learning Outcomes and Curricula

Project Management 2021									
Term 1 (trimester = 10 wks)				Term 2			Term 3		
Foreign language (professional)	4	year 1							
History and philosophy of science	4								
Psychology of management	4								
Higher Education Pedagogy	4		Teaching Practice	4	Communication in project management/Business communication	2			
Introduction to Research// Research Methodology	6		Behavioral competencies for project management/Human Resource Management	5	Project procurement and Contracting/Service model in project management	2			
Fundamentals of project management//Fundamentals of Financial Accounting	4		Economic evaluation of projects/Financial analysis of projects	3	Business simulation innovation and investment projects/ Managerial economics	4			
credits	26		Project quality management	2	IT tools for project management/Content and project cost management	5			
			Agile Project Management/Qualitative and quantitative research methods	5	Program and project portfolio management/ Models and methods of project mgnt	3			
			Project management methods and techniques//Project management	5	Project risk management	2			
			Master's research work	6	Master's research work	4			p.a.
		credits	30	credits	22			78	
Term 4 (semester = 15 wks)				Term 5					
Research Practice	16	year 2	Master Thesis	10					
Master's research work	4		Preparation and defense of a master's thesis	12					p.a.
credits	20		credits	22				42	
								total credits	120