**BIG DATA UNDERGRADUATE PROGRAM SYLLABUS**

**PROGRAM OVERVIEW**

Requirements of Big Data undergraduate program

|  |  |
| --- | --- |
| **Discipline category** | **Credits (ECTS)** |
| General education disciplines | 62 |
| Compulsory University disciplines | 16 |
| Specialty’s basic disciplines | 60 |
| Profile disciplines of specialty | 54 |
| Disciplines of additional specialization | 24 |
| Internship | 12 |
| Diploma project | 12 |
| **Total** | **240** |

**GENERAL EDUCATION DISCIPLINES**

|  |  |
| --- | --- |
| **Discipline title** | **Credits (ECTS)** |
| Foreign language | 20 |
| Information and communication technologies | 5 |
| Fundamentals of Applied Mathematics | 5 |
| Interdisciplinary module " Individual and the world" (socio-political module, Russian and Kazakh) | 12 |
| Interdisciplinary module " Society and Politics" (modern history of Kazakhstan, socio-political module, Russian and Kazakh) | 12 |
| Physical Education  | 8 |
| **Total** | **62** |

**COMPULSORY UNIVERSITY DISCIPLINES**

|  |  |
| --- | --- |
| **Discipline title** | **Credits (ECTS)** |
| Introduction to macroeconomics | 6 |
| Entrepreneurship | 5 |
| Philosophy | 5 |
| **Total** | **16** |

**SPECIALTY’S BASIC DISCIPLINES**

|  |  |
| --- | --- |
| **Discipline title** | **Credits (ECTS)** |
| Big Data Basics | 6 |
| Algorithms, Data Structures and Programming  | 6 |
| Oracle Database: SQL fundamentals | 6 |
| Software Engineering Basics  | 6 |
| Kaspersky Endpoint Security and Management (basic)  | 6 |
| Probabilistic-statistical data analysis using R program | 6 |
| Cybersecurity Basics  | 6 |
| Robotics | 6 |
| Programming Technology  | 6 |
| Computer Systems Architecture / Data Management | 6 |
| **Total** | **60** |

**SPECIALTY’S PROFILE DISCIPLINES**

|  |  |
| --- | --- |
| **Discipline title** | **Credits (ECTS)** |
| Design and Administration of Computer Networks (Cisco)/ Development of Web-applications  | 6 |
| IT-infrastructure | 6 |
| Forensic. Computer crimes / Machine learning and Data analysis | 6 |
| Scripting programming languages: PowerShell, Bash / Programming Art  | 6 |
| Cybersecurity Risk Management/ Business Process Modeling  | 6 |
| Computer Network Security / Data visualization | 6 |
| Cryptographic Data Protection Tools/ Deep Learning in Python  | 6 |
| Kaspersky Endpoint Security and Management (advanced) / IT-Project Management  | 6 |
| Data Security Audit/ Advanced Algorithms  | 6 |
| **Total** | **54** |

**ADDITIONAL SPECIALIZATION**

Students must complete 4 disciplines of additional specialization (in total, 24 credits) during 3-4 years of study. Additional specialization is selected according to the Catalogue of minors. To obtain a wider range of knowledge, it is recommended to choose an additional specialization that is not related to the student's own specialty.

**INTERNSHIP**

|  |  |
| --- | --- |
| **Internship types** | **Credits (ECTS)** |
| Educational internship | 2 |
| Industrial internship | 4 |
| Pre-diploma internship | 6 |
| **Total** | **12** |

**DIPLOMA PROJECT**

|  |  |
| --- | --- |
| **Category** | **Credits (ECTS)** |
| Research Method Disciplines | 6 |
| Writing and defense of diploma project | 6 |
| **Total** | **12** |