Supplementary materials to Appendix 7

Table 1. Updated basic academic programs in 2021-2023

No.	Educational unit	Department	Updated basic academic programs
1	Institute of Languages and Cultures of the Peoples of the Northeast	Culturology	Master's Program Culturology. Management in Culture and Arts.
2	Institute of Languages and Cultures of the Peoples of the Northeast	Socio-cultural Service and Tourism	Discipline Curriculum History of Tourism
3	Faculty of History	World History and Ethnology, History of Russia, Archaeology	Ethnodemography for the Bachelor's Program 46.03.01 History.
4	Faculty of History	World History and Ethnology, History of Russia, Archaeology	Ethnogenesis and Ethnic History of the Peoples of Yakutia (in digital technologies)
5	Institute of Natural Sciences	Ecology and Geography	Specialized Types of Observations
6	Institute of Finances and Economics	Sociology and Human Resources Management	Personnel Audit and Management
7	Institute of Finances and Economics	Sociology and Human Resources Management	Personnel Management
8	Faculty of History	History, Social Science and Political Science	Scientific and Methodical Work of a Social Science Teacher
9	Law College		Ethics and Psychology of Business Communication 40.02.01 Law and Organization of Social Services.

No.	Educational unit	Department	Updated basic academic programs
10	Institute of Engineering & Technology	Survey, Management and Cadaster of Immovable Property	Use of Digital Technologies in Construction

Table 2. Actualized major professional academic programs in 2021-2023

No.	Educational unit	Department	Updated basic academic programs
1	Institute of Languages and Cultures of the Peoples of the Northeast	Culturology	Master's Program Culturology. Management in Culture and Arts.
2	Institute of Languages and Cultures of the Peoples of the Northeast	Socio-cultural Service and Tourism	Discipline Curriculum History of Tourism
3	Faculty of History	World History and Ethnology, History of Russia, Archaeology	Ethnodemography for the Bachelor's Program 46.03.01 History.
4	Faculty of History	World History and Ethnology, History of Russia, Archaeology	Ethnogenesis and Ethnic History of the Peoples of Yakutia (in digital technologies)
5	Institute of Natural Sciences	Ecology and Geography	Specialized Types of Observations
6	Institute of Finances and Economics	Sociology and Human Resources Management	Personnel Audit and Management
7	Institute of Finances and Economics	Sociology and Human Resources Management	Personnel Management
8	Faculty of History	History, Social Science and Political Science	Scientific and Methodical Work of Social Science Teacher

| 9 | Law College | | Ethics and Psychology of Business Communication 40.02.01 Law and Organization of Social Services. |
| 10 | Institute of Engineering & Technology | Survey, Management and Cadaster of Immovable Property | Use of Digital Technologies in Construction |

Table 3. Future areas where additional majors are planned under the "Technopolis Future Skills: North-East" project implementation

Future technology	Future study area
CAD, RP, CAM processing	Additive manufacturing, by industry Designing modern engineering systems for machinery engineering
Reverse engineering methods involving additive technologies (including 3D-scanning)	
Rapid 3D additive manufacturing Prototyping	
3D additive manufacturing CAE prototyping	
Digital twin prototyping (DTP) Digital Twin Instance Digital Twin Aggregate	
Intelligent Twins	Machine learning technologies, by industry
UX/UI design	
AI and Machine Learning (by industry)	
Blockchain technologies and various software engineering techniques	Blockchain technologies and smart contracts, project management
Product lifecycle management (PLM) Project lifecycle management and PDM	Project and product lifecycle management

Building lifecycle management PLM	Technologies of data modeling and building lifecycle management (Implemented by the Department of Electrical Power Supply of the NEFU Institute of Physics and Technologies)
BIM (6D), PIM, AIM	
UAV operating	
Big data	
MBSE engineering	Digital design and engineering analysis (by industry) (Implemented by the Department of Electrical Power Supply of the NEFU Institute of Physics and Technologies)
Metal 3D printing additive manufacturing	
Generative design (bionic included)	
CAE modeling, advanced CAD	
Creative R&D	
Robotic welding	Robotic welding
CAM modeling	
SCADA systems	Automation of power networks and buildings
Data array processing and algorithms	Quantum technologies
Quantum technologies	
Advanced machine processing	Methods of synthesizing new materials
Mineral synthesis and processing	
Composite material technologies	
Industrial design (by industry)	Industrial design

Table 4. Current areas to saturate the digital market with up-to-date and future technologies (non-IT majors), future soft skills, and green skills

Code	Area	Major
08.03.01	Construction	Automobile Roads (applied) [35]
		Automobile Roads [37]
08.04.01	Construction	Quality Management of Roads in the Permafrost Zone [357]
08.05.02	Construction, operation, repair, and maintenance of highways, bridges, and tunnels	Construction (Reconstruction), Operation, and Technical Support of Roads [299]
23.03.01	Technology of Transport Processes	Transport Logistics (applied) [97]

23.03.03	Exploitation of transport - technological machines and complexes	Automotive Service [102]
23.04.01	Technology of Transport Processes	Organization and Traffic Safety [369]
23.05.01	Ground transportation and technological complexes	Hoisting-transport, construction, and road machines and equipment [327]
38.04.02	Management	Transport Management (applied) [384]
44.03.04	Professional Training (by industry)	Transport [202]
		Transport [203]
44.04.04	Professional Training (by industry)	Organization and Management of Engineering Education [436]
20.03.01	Technospheric Safety	Emergency Response [78]
		Safety of Technological Processes and Industries [84]
20.04.01	Technospheric Safety	Managing the Safe Development of the Technosphere [364]
		Fire Safety Management [365]
21.05.04	Mining	Opencast Mining [317]
		Mine and Underground Construction [321]
		Mining Machinery and Equipment [323]
21.03.01	Oil and Gas Engineering	Oil and Gas Drilling [87]
		Operation and Maintenance of Transport and Storage Facilities for Oil, Gas, and Petroleum Products [91]
		Operation and Maintenance of Transport and Storage Facilities for Oil, Gas and Petroleum Products [93]

21.05.02	Applied Geology	Prospecting and Exploration of Underground Waters and Geological-Engineering Survey [302]
		Prospecting and Exploration of Underground Waters and Geological-Engineering Survey [303]
		Petroleum Geology [306]

21.05.03	Technology of Geological Exploration	Technology and Techniques of Mineral Deposits Exploration [307]
		Geophysical Methods of Prospecting and Exploration of Mineral Deposits [312]
21.05.06	Oil and Gas Equipment and Technology	Technology of Oil and Gas Drilling [324]
05.03.02	Geography	Recreation Geography and Tourism [25]
05.03.04	Hydrometeorology	Meteorology [28]
05.03.06	Ecology and Nature Management	Nature Management [30]
05.04.02	Geography	Applied Geomatics (under the double-degree program with the Aix-Marcel University (France)) [350]
05.04.06	Ecology and Nature Management	Geoecology [351]
45.03.02	Linguistics	Translation and Translation Studies (applied) [279]
45.04.02	Linguistics	Languages and Linguistics (in English) [455]
		Foreign Language in Professional Communication [460]
01.03.02	Applied Mathematics and Computer Science	Mathematical Modeling and Numerical Methods [16]
02.03.02	Fundamental Informatics and Information Technologies	Fundamental Informatics and Information Technologies [17]
		Programming and Information Technologies [19]
02.04.02	Fundamental Informatics and Information Technologies	Project Management in Information Technologies [344]
09.03.01	Computer Science and Computer Engineering	Software for Computing and Automated Tools (applied) [49]
		Software for Computing and Automated Tools (applied) [50]
		Software Development Techniques [51]
		Software Development Techniques [52]

09.03.03	Applied Informatics	Applied Informatics in Economics [53]
		Applied Informatics in Public and Municipal Administration [55]

27.04.05	Innovation Studies	Innovation Management [371]
07.03.01	Architecture	Architecture [33]
08.03.01	Construction	Industrial and Civil Engineering [41]
		Heat and Gas Supply and Ventilation [44]
		Industrial and Civil Engineering [43]
		Heat and Gas Supply and Ventilation [46]
08.04.01	Construction	Design and Construction of Buildings and Structures in the Far North [358]
		Energy Saving and Energy Efficiency in Buildings [359]
		Building Structures, Buildings, and Structures [498]
15.03.03	Applied Mechanics	Dynamics and Strength of Machines, Devices, and Hardware [74]
03.03.03	Radiophysics	Electronics: Micro- and Nano-electronics [24]
03.04.02	Physics	
		Medical Physics [346]
		Convergence: Science-Intensive Technologies (in English) [347]
11.03.01	Radio Engineering	Radio Engineering Means of Transmission, Reception, and Signal Processing [57]
13.03.01	Heat Power Engineering and Heat Engineering	
		Power Supply of Enterprises [67]
13.03.02	Electrical Power Engineering and Electrical Engineering	Power Supply [68]
15.03.01	Mechanical Engineering	Equipment and Technology for Welding Production [72]
15.03.04	Automation of Technological Processes and Production	Automation and Digitalization of Management and Production Processes [75]

27.03.01	Standardization and Metrology	Metrology, Standardization, and Certification [109]
29.03.04	Technology of Artistic Processing of Materials	Technologies for Processing Precious Stones and Metals [111]
38.03.03	Personnel Management	Personnel Management (applied) [126]
		Convergence: Business Management in Digital Economy (in English) [376]
		Economics and Organization of Nature Management [378]

		Economics of Enterprises and Organizations of the Oil and Gas Industry [379]
38.04.02	Management	Strategic and Innovative Management (applied) [381]
		Strategic Marketing (applied) [382]
		Strategic Management (in English) (applied) [383]
38.04.03	Personnel Management	Personnel Management [387]