Human Resource Development Catalogs for New Quality Productive Forces in Beijing (2025 Edition)

To fully implement the national strategy for workforce development in the new era, strengthen human resource support for new quality productive forces, and better contribute to the development of Beijing as an international center for sci-tech innovation, the Integrated National Demonstration Zone for Opening up the Services Sector and the China (Beijing) Pilot Free Trade Zone (hereinafter referred to as the "Two Zones"), as well as the building of a high-level talent hub in the capital, the Beijing Municipal Bureau of Human Resources and Social Security hereby releases the *Human Resource Development Catalogs for New Quality Productive Forces in Beijing (2025 Edition)* (hereinafter referred to as "the *Catalogs*"). It was developed based on market research, combining big data analytics with interviews and surveys of key employers, and aligned with the industrial development needs of the city's key sectors.

I. Purpose of Compilation

The *Catalogs* is aligned with the needs of building Beijing into an international center for sci-tech innovation, advancing the development of

the "Two Zones", and constructing a high-level talent hub. It highlights technological innovation, the opening-up of the service sector, and the digital economy. Focusing on the development of new quality productive forces and the demand for urgently needed technical and skilled talent, the *Catalogs* provides an objective overview of the supply-demand dynamics, salary levels, core competency requirements, as well as the applicable professional titles and occupational categories in key industrial fields. It serves as a guide for employers, workers, human resource service providers, and education and training institutions in terms of recruitment or job-seeking, education and training, and technical skill assessment. By doing so, it promotes the in-depth development and optimized allocation of human resources, facilitates the profound integration of innovation, industry, capital, and talent chains, and contributes to the capital's high-quality development in the new era.

II. Main Contents

The *Catalogs* consists of three parts: the Catalog of Human Resource Development in Key Industries, the Catalog of Skilled Talent in Demand, and the Catalog of Technical and Skilled Talent Professional Evaluation Guidelines.

(I) Catalog of Human Resource Development in Key Industries

1. Industry: This section identifies the industries prioritized by the municipality, such as next-generation information technologies, artificial intelligence, integrated circuits, pharmaceutical and healthcare industry, intelligent manufacturing and equipment, green energy and environmental protection, intelligent connected vehicles, new materials, modern agriculture, scientific and technological services, business services, financial services, culture, and tourism.

2. Core Fields of Human Resource Development: This section identifies fields that are highly consistent with Beijing's strategic layout for key industries, characterized by high technological content, strong economic output, and significant supply and demand on both sides of the human resource market. These fields focus primarily on R&D and application, while also underlining production and manufacturing, technology transfer and commercialization, and related services such as those concerning finance, intellectual property, and human resources.

3. Key Directions of Human Resource Development: This section identifies subfields that represent the forefront of their respective core industries, underpinned by strong industrial foundations and promising development prospects. These subfields are characterized by clear application scenarios, strong commercial potential, and a rapidly growing demand for human resources, with notable talent shortages.

4. Representative Positions for Human Resource Development: This

section identifies the jobs directly associated with the key technologies, products, and business development of the key directions and widely recognized within their corresponding industries.

5. Core Competency Requirements: This section identifies the essential professional capabilities required by each core field, including capabilities of conducting academic, sci-tech research, proficiency in technical tools, capabilities of product design and application, commercialization capabilities, capabilities of technological R&D, capabilities of manufacturing and testing, and capabilities of operation management.

6. Academic Background: This section identifies the undergraduate and graduate-level majors that best meet the requirements of the specific core fields. The names and codes of the undergraduate majors listed therein are sourced from the *Catalog of Undergraduate Majors in General Higher Education Institutions (2025 Edition)* issued by the Ministry of Education of the People's Republic of China. The primary disciplines and professional degrees of the graduate majors listed therein are sourced from the *Catalog of Disciplines and Professions of Graduate Education (2022 Edition)* by the Academic Degrees Committee of the State Council and the Ministry of Education.

7. Reference Range for Annual Salary: This term refers to the interquartile range of annual salaries (12 months of pay, excluding equity

incentives, dividends, and other additional income) for representative positions of each core field. The range here is derived from third-party recruitment data collected by third-party platform and employer sample surveys, and is calculated by multiplying the monthly salary posted by 12, based on data available as of the end of June 2025.

8. Human Resource Development Rating: A star-based rating system is adopted for evaluating the specific core fields from three aspects (difficulties in talent supply-demand matching, training, and job transfer). In this section, a higher number of stars indicates a greater talent shortage and higher development value. Each core field can be rated five stars at most.

9. Key Regions with Demands: This section identifies the regions with strong industrial foundations, abundant resources, and high demands for the human resources of the core fields. These regions include some administrative districts and the Beijing Economic-Technological Development Area (hereinafter referred to as the "BDA").

(II) Catalog of Skilled Talent in Demand

1. Industry: This section identifies the industries in line with the municipality's development priorities, with rather evident supply-demand gaps for skilled talent.

2. Urgently Needed Occupations/Job Types: This section identifies the core skill jobs that are in strong demand, with high professional

standards for job seekers and large labor shortages. A job can be tagged as green (L), digital (S), or both (L/S).

3. Codes of Occupations/Job Types: The codes listed within are sourced from the *Occupational Classification of the People's Republic of China (2022 Edition)* and the occupation-related information released by the Ministry of Human Resources and Social Security, the State Administration for Market Regulation, and the National Bureau of Statistics.

4. Basic Description of Occupations/Job Types: This section provides a description of the work content and scope of each occupation or job type.

5. Reference Median of Annual Salary: This refers to the median value of annual salaries (12 months of pay, excluding equity incentives, dividends, and other additional income) offered in job postings for an occupation/job type. The data are derived from job vacancy information collected by third-party platforms as well as sample surveys of employers with urgent or critical workforce needs. The median is calculated by multiplying the monthly salary offered by each employer concerned by 12, based on data available as of the end of June 2025.

6. Rating of Shortage and Urgency for Occupations/Job Types: Occupations or job types are rated based on the degrees of shortage and urgency. The rating is divided into three levels: "Moderate", "Severe", and

"Critical".

7. Key Regions with Demands: This section identifies the regions where industries have high demands for the corresponding skilled employees. These regions include some administrative districts and the BDA.

(III) Catalog of Technical and Skilled Talent Professional Evaluation Guidelines

1. Industries: This section focuses on key development sectors in the city, such as high-precision industries, pharmaceutical and health industries, and cultural and creative industries, including 12 industrial fields: new-generation information technology, artificial intelligence, robotics, integrated circuits, low-altitude technology, automotive industry, intelligent manufacturing and equipment, technology services, green energy and environmental protection, pharmaceutical and health, cultural and creative industries, cultural relics and museology, etc.

2. Basic Description of Occupations/Job Types: Based on the *Occupational Classification of the People's Republic of China (2022 Edition),* this section provides a description of the work content and scope of each occupation or job type, .

3. Professional Title Series: This section focuses on fields with high integration of professional technical talents and skilled talents, and provides guidelines within series such as engineering technology,

industrial arts, and cultural relics and museology, in accordance with documents on professional title system reform and skilled talent evaluation system issued by the Ministry of Human Resources and Social Security.

4. Evaluation Specialties: Based on the *Beijing Professional Title Evaluation Specialty Catalog*, this section provides guidance for 15 specialties: artificial intelligence, robotics, communications, cyberspace security, integrated circuits, low-altitude technology, automotive, public equipment installation, transportation, technology brokerage, environmental protection, chemical pharmaceuticals, fine arts, exhibition design, and cultural relics and museology.

5. Codes of Occupations/Job Types: The codes listed within are sourced from the *Occupational Classification of the People's Republic of China (2022 Edition)* and the occupation-related information released by the Ministry of Human Resources and Social Security, the State Administration for Market Regulation, and the National Bureau of Statistics.

III. Purposes of *Catalogs*

(I) Enhancing Market Entities' Efficiency in Human Resource Allocation. Workers can use the *Catalogs* as an "opportunity list" for employment and entrepreneurship, to pursue job opportunities in a

targeted manner and improve their professional competencies accordingly. Employers can use it as an "operational checklist" for talent selection, cultivation, retention, and utilization, formulating precise plans for human resource development and creating more job opportunities on its basis. Human resource service agencies can use it as a "demand list" reflecting current market conditions, thereby stepping up efforts to attract outstanding talented minds in China and the rest of the world and provide specialized and efficient services.

(II) Aligning Human Resource Supply from Education Institutions with Market Demand. Higher education and vocational institutions can adjust their curricula and courses in line with the *Catalogs* to enhance the innovation capabilities and practical skills of young talented minds, to advance supply-side structural reform and train more professionals suited for the high-quality development of Beijing in the new era, with capabilities of innovation, practical abilities, and skills in need.

(III) Enhancing the Relevance and Effectiveness of Talent Training of Training Institutions. Training institutions may adapt and develop training programs based on the *Catalogs* to help workers improve their technological expertise and technical skills. Training institutions and employers can also jointly design and deliver training programs with reference to the *Catalogs*, thereby deepening

industry-academia integration and promoting mutual development.

(IV) Expanding Career Development Pathways for Technical and Skilled Professionals. Encourage technical and skilled professionals to pursue professional title evaluations or vocational skill level accreditation according to their career plans, technical strengths, and job requirements, referencing the industry sectors and basic occupational descriptions in the Catalog of Technical and Skilled Talent Professional Evaluation Guidelines. Technical and skilled professionals with interdisciplinary expertise may achieve "dual-track promotion".

(V) Strengthening Service Capacity Across Governmental Authorities and Social Organizations. The *Catalogs* serves as a reference for governmental authorities at all levels in formulating and refining the policies for employment, entrepreneurship, and talent services. It also provides guidance for social organizations to deliver more targeted and precise services.

IV. Policy Support

The Beijing Municipal Bureau of Human Resources and Social Security, in collaboration with relevant municipal authorities, will provide policy incentives and service support based on the *Catalogs* to promote its application and implementation.

In terms of talent attraction and aggregation, eligible Chinese nationals, including local professionals, overseas returnees, university graduates, and postdoctoral researchers who have completed their research assignments, who are employed in key technology or core operational positions in the key industries listed in the *Catalogs*, may apply for settlement, work permits, and residence permits in Beijing. Furthermore, eligible foreign workers meeting the relevant criteria of the *Catalogs* will be facilitated in applying for work permits in China.

In terms of talent selection and cultivation, high-level talented individuals aligned with the *Catalogs* will be supported in applying for municipal-level talent projects and scientific research projects, with outstanding candidates to be recommended by relevant authorities. Entities are also encouraged to apply for advanced training programs under the Knowledge Renewal Project for Professional and Technical Personnel, with priority given to those consistent with the *Catalogs* under the same conditions.

In terms of evaluation and incentives, talent evaluation systems for the key industries covered by the *Catalogs* will be further reformed, to open up career development pathways for technical and skilled professionals. Enterprises involved in the listed industries will be supported in establishing incentive mechanism for talent evaluation and

utilization. Enterprises and employees in key industrial sectors will be supported in organizing or participating in vocational skills training.

In terms of service assurance, human resource service agencies are encouraged to provide tailored services to market entities based on the *Catalogs*, and efforts will be made to align the *Catalogs* with Beijing's headhunting incentive policies. At the same time, publicity and scenario-based application of the *Catalogs* will be strengthened to enhance its social impact and create a favorable environment for the rational flow and efficient allocation of human resources.

I. Catalog of Human Resource Development in Key Industries

S/N	Industry	Core Fields of Human Resource Development	Key Development Directions	Representative Positions for Human Resource Development	Core Competency Requirements	Academic Background	Reference Range for Annual Salary (10,000 Yuan)	Human Resource Development Rating	Key Regions with Demands
1	New-generation information technologies	R&D and application of 5G-A technologies (including those of 6G cutting-edge technologies)	Construction of 5G-A network infrastructure and R&D of wireless technologies solutions; Design of 5G-A core network architecture and R&D of uplink/downlink ultra-wideband and flexible spectrum access technologies; R&D of technologies in core fields, including 5G-A super networking technologies, intelligent air interface, converged communication technologies, terahertz communication technologies, and reconfigurable intelligent metasurface (RIS) technologies	5G-A R&D engineer, 5G-A solution engineer, optical communication engineer, 5G-A RF engineer, communication algorithm engineer, 5G-A performance optimization engineer, 5G-A network security engineer, 6G network architecture researcher, terahertz communication system engineer, etc.	A candidate must: Possess an in-depth understanding of communication fundamentals, the characteristics of 5G-A technologies, and the development trends in 6G technologies; Demonstrate comprehensive capabilities throughout the entire lifecycle of wireless communication products, along with familiarity with version R&D and application processes; Possess hands-on experience in the development of key technologies and vertical industrial applications relevant to 5G-A networks, along with foundational knowledge of 6G network architecture evolution and research capabilities in key technologies, including terahertz communication, RIS, integrated communication, sensing, and computation (ICSC), and space-air-ground integrated networks; Understand 5G application scenarios, including IoT, smart cities, cooperative vehicle infrastructure systems (CVIS), XR, and the industrial Internet, while demonstrating the ability to conceptualize future scenarios for 6G; Excel in performance or RF optimization, and have clear strategies for addressing network issues.	Undergraduate Programs: Electronic Information (0807) and Computer (0809) Graduate Programs: Electronic Information (0854), Electronic Science and Technology (0809), Information and Communication Engineering (0810), and Computer Science and Technology (0812)	34-56	☆☆☆☆☆	Haidian District, Chaoyang District, Changping District, Xicheng District, Beijing Economic-Technological Development Area, and Fangshan District

2		R&D and application of 10-gigabit optical network technologies	R&D of ultra-high-speed optical fiber transmission, 50G PON, high-speed wireless LAN technologies, and standard silicon photonic chips; R&D of silicon photonic module technologies	Optical fiber R&D engineer, high-speed optical module engineer, silicon photonic chip R&D engineer, 10-gigabit optical network system architect, 10-gigabit optical network standard certification engineer, etc.	A candidate must: Be familiar with the optical fiber industry's standards; Possess the knowledge of the packaging and testing techniques, as well as the internal structures of optical module devices; Demonstrate proficiency in the operating principles, product design, and implementation techniques of high-speed optical transceivers/optical devices, with hands-on experience in hardware/software design, R&D, and debugging; Be well-versed in industrial standards and the testing and verification processes for high-speed optical modules; Be familiar with the specifications and circuit applications of core components in high-speed optical modules and analog-digital chips, and demonstrate strong problem-solving skills.	Undergraduate Programs: Electronic Information (0807), Computer (0809), and Materials (0804) Graduate Programs: Electronic Information (0854), Electronic Science and Technology (0809), Information and Communication Engineering (0810), and Computer Science and Technology (0812)	36-66	☆☆☆	Haidian District, Chaoyang District, Tongzhou District, Shijingshan District, Beijing Economic-Technological Development Area, and Fengtai District
3		R&D of sensors	R&D of intelligent, miniaturized, multifunctional, low-power, and high-precision sensor technologies and new materials; R&D in specific areas, including high-performance optical fiber, micro-electro-mechanical system (MEMS) technologies, wafer-level packaging, and software algorithms; R&D of high-performance optical fiber sensors, MEMS technologies, and advanced packaging technologies; R&D of cutting-edge sensor technologies, including those concerning biosensors, environmental sensors, and quantum sensors	Multi-sensor fusion engineer, sensor development engineer, sensor test engineer, sensor application engineer, intelligent sensor system engineer, etc.	A candidate must: Be familiar with chip development technologies for high-performance optical fiber sensors, MEMS sensors, and multi-sensor SoCs; Be able to apply AI algorithms in sensor data fusion, pattern recognition, and anomaly detection; Possess extensive knowledge of industrial networks, and be familiar with the architecture design of industrial networks and industrial buses; Be well-versed in the R&D and debugging of mainstream sensors, including ultrasonic radar, millimeter wave radar, and LIDAR.	Undergraduate Programs: Electronic Information (0807), Computer (0809), Instrument (0803), and Machinery (0802) Graduate Programs: Electronic Information (0854), Electronic Science and Technology (0809), Information and Communication Engineering (0810), Computer Science and Technology (0812), and Mechanical Engineering (0802)	31-56	☆☆☆☆	Haidian District, Chaoyang District, Changping District, Beijing Economic-Technological Development Area, Dongcheng District, and Shunyi District

4		R&D and application of UHD video and advanced display technologies	R&D of hardware equipment and software technologies, including those concerning 8K/12K UHD video shooting, AI-enhanced encoding and decoding, 5G/6G ultra-low-latency transmission, and new display; R&D of AI-based UHD video processing and content generation technologies; R&D of cutting-edge display technologies, including Mini/Micro LED, quantum dots, and OLED; R&D of immersive UHD technologies for VR/AR, digital twin, and metaverse; R&D of UHD video cloud computing and edge rendering technologies	AI video codec algorithm engineer, 8K/12K video system engineer, VR/AR visual system engineer, audio/video development engineer, audio/video codec engineer, R&D engineer for image sensors, R&D engineer for new display devices, etc.	A candidate must: Understand the large-scale applications of UHD video technologies across various industries; Have mastered the relevant core technologies, including AI video processing algorithms and high dynamic range (HDR) image processing; Demonstrate the ability to apply deep learning techniques in video processing; Be familiar with the design and optimization of UHD video processing chips, parallel computing, and AI accelerators; Grasp the principles of advanced display technologies; Possess specialized knowledge in color science, visual perception, and display standardization.	Undergraduate Programs: Electronic Information (0807), Computer (0809), and Design Science (1305) Graduate Programs: Electronic Information (0854), Electronic Science and Technology (0809), Information and Communication Engineering (0810), Design (1357), and Design Science (1403)	26-47	☆☆☆☆☆	Haidian District, Chaoyang District, Xicheng District, Changping District, Dongcheng District, Shijingshan District, and Tongzhou District
5	New-generation information technologies	R&D of commercial satellite and constellation technologies	R&D of system technologies, including those for constellation design and intelligent operations, heterogeneous constellation security management, and satellite-terrestrial integrated networking; R&D of manufacturing technologies, including those for integrated satellite design, intelligent assembly and testing, electric propulsion systems, and laser communication terminals; R&D of ground technologies, including those for satellite testing, operation and control, baseband chips, and antenna	Constellation system architect, satellite design engineer, intelligent assembly and testing engineer, laser communication engineer, electric propulsion engineer, baseband chip engineer, antenna engineer, satellite testing, operation and control engineer, satellite-terrestrial integrated network engineer, constellation operation engineer, etc.	A candidate must: Have mastered system technologies, including those for constellation system design, intelligent operation management, and satellite-terrestrial integrated networking; Demonstrate production capabilities, including those for integrated satellite design, intelligent assembly and testing, and mass production; Demonstrate proficiency in key payload technologies, including laser communication, electric propulsion, and phased array antennas; Understand core device technologies, including those of baseband chips, RF chips, and special algorithms; Demonstrate operational capabilities in satellite testing, operation and control, data processing, and the safe operation of constellations; Be familiar with cutting-edge technologies, including those of space-ground integrated architecture, and 6G satellite fusion; Understand industrialization requirements, including those of frequency-orbit coordination,	Undergraduate Programs: Aerospace (0820), Electronic Information (0807), and Surveying and Mapping (0812) Graduate Programs: Aeronautical and Astronautical Science and Technology (0825), Electronic Science and Technology (0809), Information and Communication Engineering (0810), and Surveying and Mapping Science and Technology (0816)	29-52	☆☆☆	Haidian District, Chaoyang District, Xicheng District, Changping District, Beijing Economic-Technological Development Area, Fengtai District, and Shunyi District

			algorithms; R&D of technologies for space-ground integrated network architecture		network security, and business model innovations.				
6		R&D of quantum information technologies	Research on quantum computing algorithms in chemistry, biopharmaceuticals, finance, meteorology, etc.; Design of instruction sets for superconducting quantum chips; Selection of RF devices, analysis of schematics, design and simulation debugging of printed circuit boards (PCBs), assembly and debugging of high-throughput RF circuits; Superconducting quantum computing measurement, and design of control system software; Calibration of superconducting quantum chips, bit calibration, and R&D of related software; R&D of quantum communication technologies; R&D of quantum measurement technologies	Quantum algorithm engineer, quantum computing engineer, quantum instruction set designer, RF development engineer, R&D engineer for quantum computing measurement and control software, quantum communication engineer, quantum measurement engineer, quantum optics engineer, etc.	A candidate must: Be familiar with digital circuit design specifications for quantum computing; Demonstrate proficiency in classical quantum algorithms and programming languages, and possess the knowledge of algorithms and data structures; Possess experience in electromagnetic and microwave fundamentals, as well as in analog and high-frequency circuit design, and understand the manufacturing and testing methods for RF devices and printed circuit boards; Be well-versed in the principles of quantum communication and familiar with its key technologies; Have mastered quantum communication system integration, quantum measurement, and data processing methods.	Undergraduate Programs: Electronic Information (0807), Computer (0809), and Physics (0702) Graduate Programs: Electronic Information (0854), Electronic Science and Technology (0809), Information and Communication Engineering (0810), Computer Science and Technology (0812), and Physics (0702)	28-66	☆☆☆☆	Haidian District, Chaoyang District, Changping District, Xicheng District, Beijing Economic-Technological Development Area, Dongcheng District, and Shunyi District
7		R&D and application of IoT technologies	R&D of low-power wide-area network (LPWAN) technologies; Key technology R&D, reliability evaluation, standard development, and product application for integrated wireless sensing devices; Application of IoT technologies in agriculture, industry, energy, logistics, and other sectors	IoT architect, expert in IoT positioning technologies, RF engineer, R&D engineer for integrated wireless sensing devices, integrated wireless sensing device testing engineer, engineer for research on and development of standards for sensing devices and systems, integrated wireless sensing device	A candidate must: Be familiar with cutting-edge technologies, including high concurrency, cloud computing, and distributed computing; Have an understanding of electronic technologies and wireless RF technologies; Be familiar with intelligent sensors and sensor network application technologies; Possess the knowledge of automatic identification technologies, including barcodes and RFID; Be familiar with relevant technologies, including those of wireless sensor networks, industrial Ethernet, and fieldbus;	Undergraduate Programs: Electronic information (0807), Computer (0809), and Automation (0808) Graduate Programs: Electronic Information (0854), Electronic Science and Technology (0809), Information and Communication Engineering (0810), Computer Science and Technology (0812), and Control Science and Engineering (0811)	26-47	☆☆☆	Haidian District, Chaoyang District, Daxing District, Changping District, Fengtai District, Beijing Economic-Technological

				and system solution engineer, etc.	Be familiar with IoT terminal products and system evaluation technologies; Be familiar with various sensors and wireless communication networking technologies; Understand the characteristics and application specifications of GPS, IMU, and other relevant equipment; Demonstrate the ability to design, model, simulate, test, and debug major RF devices; Demonstrate proficiency in using EDA tools; Have experience s with RF/analog chip tape-out processes; Understand the application principles of IoT technologies in smart agriculture, industry, energy, and logistics, and possess the ability to support and promote technologies' industrialization and commercialization.				Development Area, and Tongzhou District
8		R&D and application of next-generation Internet technologies	R&D and application of IPv6+ next-generation Internet technologies, and technologies concerning DNS root servers, software-defined network (SDN), the industrial Internet, etc.	IPv6+ network engineer, IPv6+ system architect engineer, IPv6+ core router R&D engineer, DNS R&D engineer, SDN R&D engineer, switch R&D engineer, data communication test engineer, etc.	A candidate must: Demonstrate proficiency in TCP/IP network protocols and standards; Be familiar with the operating principles of switches and routers, as well as operating system platform and protocol development; Understand major communication standards and protocols, including PLC, OPC in SCADA, and MODBUS, as well as the principles and deployment of IPv6; Be able to independently configure data communication equipment; Be familiar with network technologies, including NAT, VPN, load balancing, SR, SDN, NFV, and Overlay; Hold internationally recognized professional qualification(s), including ACM senior membership.	Undergraduate Programs: Electronic Information (0807) and Computer (0809) Graduate Programs: Electronic Information (0854), Electronic Science and Technology (0809), Information and Communication Engineering (0810), and Computer Science and Technology (0812)	22-44	☆☆☆☆☆	Haidian District, Chaoyang District, Xicheng District, Fengtai District, Daxing District, and Dongcheng District
9	New-generation information technologies	Big data exchange services	Construction and operation of data exchange platforms; Development of standards and rules for the fields of data exchange and data assets; Evaluation and pricing services of data assets	Data exchange platform development engineer, data exchange platform operation expert, data asset business research specialist, data exchange standardization engineer, data asset standardization engineer, data asset appraiser, data exchange and data asset consultant,	A candidate must: Be familiar with the methods and models used for evaluating data assets, including those based on market comparison, cost, and income, and be able to select appropriate models for specific evaluations; Possess fundamental knowledge of economics to understand the value and influencing factors of data assets, as well as the law of market supply and demand;	Undergraduate Programs: Computer (0809), Science of Finance (0203), Mathematics (0701), and Economics (0201) Graduate Programs: Computer Science and Technology (0812), Finance (0251), Mathematics (0701), Applied Economics (0202), and Digital Economy (0258)	23-39	☆☆☆☆☆	Haidian District, Chaoyang District, Xicheng District, Dongcheng District, Fengtai District, Shijingshan

				etc.	Understand relevant laws, regulations, and compliance requirements, and be able to identify and assess legal risks and compliance issues related to data assets.				District, and Beijing Economic-Technological Development Area
10		Development of computing power infrastructure	Construction of data centers for national hub nodes and AI computing power data centers; Development of edge computing power and interconnection platforms; R&D of advanced storage technologies and computing power security systems	Data center architect, data center system operation and maintenance engineer, data center server engineer, AI data center network interconnection engineer, system security engineer, data security engineer, etc.	A candidate must: Possess a deep understanding of industry standards related to data centers; Understand the principles and applications of distributed open-source projects; Possess hands-on experience with high-speed I/O operations, TCP/IP, and RDMA network protocols; Exhibit proficiency in protocols and algorithms for large-scale data center networks, and be able to optimize networks to meet business needs; Understand system reliability and availability design, with experience in server monitoring, fault prediction, and the operations and maintenance of massive server farms; Be familiar with data security technologies; Have an understanding of data security risks, protection measures, and international privacy standards; Be familiar with the principles and applications of information security products; Be well-versed in the operation and maintenance processes of data centers.	Undergraduate Programs: Computer (0809) and Electronic Information (0807) Graduate Programs: Computer Science and Technology (0812), Electronic Science and Technology (0809), Information and Communication Engineering (0810), and National Security Studies (1402)	20-45	☆☆☆☆☆	Haidian District, Chaoyang District, Xicheng District, Changping District, Shijingshan District, Dongcheng District, and Beijing Economic-Technological Development Area
11		Cloud computing services	Construction of cloud computing data centers; Development of cloud computing software	Cloud computing R&D engineer, cloud computing operation and maintenance engineer, cloud platform development engineer, cloud computing platform product manager, etc.	A candidate must: Be familiar with cloud computing IaaS architecture, including OpenStack, Zstack, Kubernetes, Docker, and other related technologies; Possess experience in the R&D of cloud center networks and virtualized networks (e.g., KVM, OVS, DPDK, and NFV); Be familiar with mainstream distributed storage solutions, including GFS, Ceph and GlusterFS; Hold internationally recognized professional qualification(s), including those for Kubernetes Application Developer, Kubernetes Administrator, Kubernetes Security Specialist, and Azure Solutions Architect Expert; Have hands-on experience in testing, operation	Undergraduate Programs: Computer (0809) and Electronic Information (0807) Graduate Programs: Computer Science and Technology (0812), Electronic Information (0854), and Information and Communication Engineering (0810)	21-48	☆☆☆☆☆	Haidian District, Chaoyang District, Xicheng District, Dongcheng District, Beijing Economic-Technological Development Area, and Fengtai District

					and maintenance, and after-sales technical support for cloud computing platforms.				
12		Network and information security services	R&D of network and application security attack and defense principles, technologies, and tools; Building of security system architecture; Development of network and information security regulations and standards; R&D and application of trusted computing technologies	Cybersecurity engineer, penetration testing engineer, information security engineer, cybersecurity architect, etc.	A candidate must: Be familiar with the principles of TCP/IP protocols and network mechanisms, as well as common network security devices, including firewalls, IPS/IDS, load balancers, vulnerability assessment tools, and monitoring and auditing tools; Be familiar with network and information security management regulations and standards, and understand China's national policies, standards, and work processes related to classified protection; Demonstrate proficiency in web security technologies and be familiar with penetration testing processes; Have an in-depth understanding of software-defined security, and be able to build a security system architecture tailored to specific requirements, and to develop and implement response strategies for common attack vectors; Hold internationally recognized professional qualification(s), including CISA and CISSP.	Undergraduate Programs: Computer (0809) and Electronic Information (0807) Graduate Programs: Computer Science and Technology (0812), Electronic Information (0854), Electronic Science and Technology (0809), Information and Communication Engineering (0810), and Cyberspace Security (0839)	17-36	☆☆☆☆	Haidian District, Chaoyang District, Xicheng District, Changping District, and Dongcheng District
13	New-generation information technologies	R&D and application of industrial Internet	R&D and application of edge computing technologies; R&D and application of industrial automation and control, industrial AR, and digital twin technologies; R&D of industrial network operating systems; R&D and application of industrial App platform technologies	Edge computing engineer, industrial automation engineer, AR software engineer, AR product manager, digital twin standardization engineer, etc.	A candidate must: Be familiar with edge computing, IoT, and other technological concepts and main application scenarios; Demonstrate proficiency in multi-threaded and high-concurrency system programming and optimization techniques; Understand the design and application of distributed systems; Be familiar with MEC/edge computing-related technologies stacks and open-source frameworks; Be familiar with the core network architecture, along with the work processes of control and forwarding planes; Know the operating principles of various automated electrical components; Understand industry-specific design specifications and standards, as well as the structures and operating principles of various electrical equipment, instruments, and meters.	Undergraduate Programs: Computer (0809), Electronic Information (0807), and Automation (0808) Graduate Programs: Computer Science and Technology (0812), Electronic Information (0854), Electronic Science and Technology (0809), Information and Communication Engineering (0810), Control Science and Engineering (0811), and Software Engineering (0835)	22-46	☆☆☆☆☆	Haidian District, Chaoyang District, Xicheng District, Beijing Economic-Technological Development Area, Daxing District, and Changping District

14		Development of basic software	R&D of industrial software; R&D of operating systems, databases, middleware, and embedded systems; R&D of industrial application software	Industrial software development engineer, operating system development engineer, database engineer, middleware development engineer, embedded system R&D engineer, industrial application software development engineer, operation and maintenance engineer, etc.	A candidate must: Be familiar with operating systems, databases, middleware, embedded system kernel design, compilation, and underlying driver technologies; Possess relevant work experience in industrial robot application control, integrated development of automated production lines, image processing, and IT applications; Possess strong skills in logical analysis, design, and documentation; Be able to take charge of the design and debugging of embedded product software independently; Demonstrate solid core expertise in computer networks, operating systems, and principles of computer composition; Be familiar with industry-specific business systems and have experience in the design, R&D or implementation of related systems; Possess experience in open-source projects; Hold internationally recognized professional qualification(s), including those for IEEE Fellow, IEEE Senior Member, and DevOps Engineer Expert.	Undergraduate Programs: Computer (0809), Electronic Information (0807), Mathematics (0701), and Automation (0808) Graduate Programs: Computer Science and Technology (0812), Electronic Information (0854), Electronic Science and Technology (0809), Information and Communication Engineering (0810), and Software Engineering (0835)	18-35	☆☆☆☆☆	Haidian District, Chaoyang District, Xicheng District, Dongcheng District, and Fengtai District
15		BeiDou navigation and location services	R&D of technologies for BeiDou, including those for positioning, navigation, and timing (PNT) and high-precision positioning; Application of BeiDou satellite navigation technologies across industries, including agriculture, forestry, animal husbandry and fishery, energy, finance, and transportation	Satellite navigation algorithm engineer, satellite application solution planning expert, GNSS development engineer, senior engineer for anti-jamming algorithms of satellite navigation, etc.	A candidate must: Demonstrate proficiency in GNSS positioning theory, least squares, and Kalman filter; Have in-depth knowledge of PVT, differential positioning, and RTK algorithms; Be familiar with the latest data processing technologies, including GPS, GLONASS, BDS, GALILEO, QZSS, and SBAS, as well as tri-band and multi-band data processing technologies; Be familiar with general data transmission protocols for receivers, including NMEA and RTCM protocols; Possess experience in developing products and services that utilize BeiDou's satellite navigation technologies for applications in vertical industries.	Undergraduate Programs: Electronic Information (0807), Surveying and Mapping (0812), Geographical Science (0705), Geophysics (0708), and Physics (0702) Graduate Programs: Electronic Information (0854), Electronic Science and Technology (0809), Information and Communication Engineering (0810), Surveying and Mapping Science and Technology (0816), and Geography (0705)	26-51	☆☆☆☆☆	Haidian District, Chaoyang District, Fengtai District, Dongcheng District, Xicheng District, and Beijing Economic-Technological Development Area

16		R&D and application of blockchain technologies	R&D of next-generation blockchain core technologies, development of trusted digital infrastructure and service platforms, integrated application of blockchain and multiple other technologies, and security protection and supervision technologies of blockchain	Blockchain core algorithm engineer, blockchain system architect, blockchain hardware engineer, blockchain security engineer, blockchain data element engineer, blockchain standardization engineer, etc.	A candidate must: Demonstrate proficiency in distributed systems, consensus algorithms, encryption algorithms, and smart contracts, and other underlying technologies of blockchain, and possess the ability to research and develop next-generation core technologies, including privacy protection, cross-chain interoperability, distributed networking, and post-quantum cryptographic algorithms; Have mastered the development of trusted digital infrastructure and service platforms, with a focus on relevant areas, including trusted storage, chain network interconnection, digital identity, and data storage; Demonstrate the ability to integrate blockchain with diversified scenarios, including AI large models, data element circulation, healthcare, finance, education, and transportation.	Undergraduate Programs: Computer (0809), Mathematics (0701), and Statistics (0712) Graduate Programs: Computer Science and Technology (0812), Electronic Science and Technology (0809), Information and Communication Engineering (0810), and Software Engineering (0835)	24-48	☆☆☆☆☆	Chaoyang District, Haidian District, Xicheng District, Dongcheng District, and Changping District
17	New-generation information technologies	R&D and application of VR technologies	R&D and application of technologies in the fields of near-eye display (NED), rendering computing, holographic imaging, perception and interaction, network transmission, content production, etc.	VR software engineer, VR hardware engineer, 3D modeler and animator, VR interaction designer, VR system architect, VR content creator, etc.	A candidate must: Have mastered the fundamental theories of VR technologies, computer graphics, human-computer interaction, and sensor technologies; Possess core skills in 3D modeling, real-time rendering, interactive design, and virtual environment development; Demonstrate proficiency in development tools, including Unity, Unreal Engine, and OpenGL, as well as in embedded system technologies; Understand key best practices, including user experience optimization, reduction of motion sickness, and network transmission delay control; Demonstrate comprehensive capabilities in VR hardware integration, content creation, and cross-platform application development.	Undergraduate Programs: Computer (0809), Electronic Information (0807), Design Science (1305), and Drama and Film Studies (1303) Graduate Programs: Computer Science and Technology (0812), Software Engineering (0835), Optical Engineering (0803), and Control Science and Engineering (0811)	17-34	☆☆☆☆	Chaoyang District, Haidian District, Shijingshan District, Dongcheng District, and Tongzhou District
18	Artificial intelligence	R&D of embodied AI technologies	R&D of visual, auditory, haptic, and other perception technologies, human-computer interaction and collaboration technologies, motion control and path planning technologies, robot operating systems, etc.	Embodied AI algorithm engineer, robot perception engineer, sensor fusion engineer, motion control engineer, human-computer interaction engineer, robot system engineer, etc.	A candidate must: Have mastered the fundamental theories of robotics, control theory, computer vision, and sensor fusion; Possess the ability to develop core algorithms, including those for SLAM, path planning, motion control, and multimodal perception; Demonstrate proficiency in engineering technologies, including ROS, deep learning frameworks, and embedded development;	Undergraduate Programs: Automation (0808), Machinery (0802), Electronic Information (0807), and Computer (0809) Graduate Programs: Control Science and Engineering (0811), Mechanical Engineering (0802), Computer Science and Technology (0812), and Electronic Information (0854)	25-55	☆☆☆☆☆	Haidian District, Chaoyang District, Daxing District, Tongzhou District, Changping District,

					Have an understanding of engineering practices related to human-computer interaction design, security control, and real-time systems; Possess comprehensive skills in robot hardware integration, system debugging, and product development.				Dongcheng District, Fengtai District, and Beijing Economic-Technological Development Area
19		R&D of generative AI (AIGC) technologies	Application and development of large language models; Multimodal content generation; Intelligent agent architecture design; Prompt engineering and fine-tuning; Retrieval-augmented generation (RAG); Development of AI agents; R&D technologies for human-computer dialogue systems, etc.	Generative AI algorithm engineer, intelligent agent development engineer, large model application engineer, generative AI product manager, dialogue system engineer, AI content review engineer, etc.	A candidate must: Have mastered core algorithms, including those for Transformer architecture, generative models, and reinforcement learning; Possess application development capabilities, including those of large model fine-tuning, prompt engineering, and RAG system construction; Demonstrate proficiency in development tools like PyTorch, LangChain, and vector databases; Possess the knowledge of key technical aspects, including multimodal fusion, content security, and model evaluation; Possess comprehensive capabilities in AI product design, user experience optimization, and commercialization.	Undergraduate Programs: Computer (0809), Electronic Information (0807), Mathematics (0701), and Statistics (0712) Graduate Programs: Computer Science and Technology (0812), Software Engineering (0835), and Intelligent Science and Technology (1405)	26-61	☆☆☆☆☆	Haidian District, Chaoyang District, Dongcheng District, Changping District, Xicheng District, and Beijing Economic-Technological Development Area
20		R&D of efficient large model computing technologies	Large model training and inference optimization; Distributed computing architecture; Model compression and quantization; Optimization of GPU/NPU computing power; Model parallelism and data parallelism; Edge computing deployment; R&D of technologies for high-performance computing clusters, AI chip adaptation, etc.	Large model training engineer, AI system architect, high-performance computing engineer, model optimization engineer, AI infrastructure engineer, distributed system engineer, etc.	A candidate must: Demonstrate in-depth expertise in core technologies, including those of deep learning frameworks, distributed training, and model parallelism; Possess system capabilities in GPU programming, CUDA optimization, cluster scheduling, and storage optimization; Be proficient in optimization techniques, including model compression, quantitative deployment, and inference acceleration; Have an understanding of underlying technologies, including AI chip architecture, compiler optimization, and performance tuning; Possess engineering capabilities in large-scale system design, cost control, and technology selection.	Undergraduate Programs: Computer (0809), Electronic Information (0807), Mathematics (0701), and Physics (0702) Graduate Programs: Computer Science and Technology (0812), Electronic Science and Technology (0809), Integrated Circuit Science and Engineering (1401), and Software Engineering (0835)	23-53	☆☆☆☆	Haidian District, Chaoyang District, Xicheng District, Tongzhou District, and Dongcheng District

21	Artificial intelligence	R&D of multimodal semantic alignment and cognitive reasoning technologies	Vision-language understanding and generation; Multimodal representation learning; Cross-modal retrieval and matching; Cognitive reasoning and knowledge graphs; Causal reasoning and logical reasoning; Commonsense reasoning and symbolic computing; R&D of technologies for multimodal dialogue systems, etc.	Multimodal algorithm engineer, cognitive reasoning engineer, knowledge graph engineer, visual language engineer, inference system engineer, multimodal product manager, etc.	A candidate must: Be proficient in core algorithms, including those of computer vision, natural language processing, and multimodal fusion; Possess technical capabilities in knowledge graph construction, inference engine development, and semantic understanding; Be well-versed in cutting-edge technologies, including graph neural networks, attention mechanisms, and pre-trained models; Have an understanding of the theoretical foundations of cognitive science, logical reasoning, and symbolic computing; Possess R&D capabilities in complex AI system design, algorithm innovation, and technical research.	Undergraduate Programs: Computer (0809), Mathematics (0701), Electronic Information (0807), and Pedagogy (0401) Graduate Programs: Computer Science and Technology (0812), Intelligent Science and Technology (1405), Mathematics (0701), and Psychology (0402)	35-66	☆☆☆☆☆	Haidian District, Chaoyang District, Xicheng District, Dongcheng District, Changping District, and Tongzhou District
22		R&D and application for intellectualization of sectors	R&D and application for the intellectualization of sectors including healthcare, financial risk control, education and training, transportation and logistics, and smart cities	AI solution architect, industrial AI engineer, intelligence consultant, AI product manager, industrial AI expert, digital transformation expert, AI project manager, etc.	A candidate must: Have mastered core AI technologies, including those of machine learning, deep learning, and data mining; Possess consulting capabilities, including those of industry-specific business understanding, demand analysis, and solution design; Be proficient in digital technologies, including cloud computing, big data, and the IoT; Have an understanding of industry standards, compliance requirements, business models, and other relevant industry knowledge; Demonstrate well-rounded skills in project management, teamwork, and customer communication.	Undergraduate Programs: Computer (0809), Business Administration (1202), Industrial Engineering (1207), and Management Science and Engineering (1201) Graduate Programs: Computer Science and Technology (0812), and Management Science and Engineering (1201)	25-52	☆☆☆☆	Haidian District, Chaoyang District, Xicheng District, Dongcheng District, Fengtai District, Changping District, and Beijing Economic-Technological Development Area
23	Integrated circuit	Chip design, and R&D of EDA tools	R&D of technologies for the development of EDA tool chains, chip architecture design, circuit design, design verification, etc.	EDA platform development engineer, EDA software R&D engineer, compiler development engineer, IC design engineer, analog IC designer, analog-digital hybrid IC designer, CPU architect, storage and computing integrated chip architect, silicon photonic chip design engineer, electronic circuit designer,	A candidate must: Be familiar with compiler principles, with expertise in the development and management of standard EDA tools; Demonstrate proficiency in Verilog and VHDL programming technologies, as well as simulation, synthesis, and timing analysis; Have mastered Xilinx and Altera FPGA architectures; Possess the knowledge of ARM, x86, RISC-V, and other architectures, as well as compiler design;	Undergraduate Programs: Electronic Information (0807) and Computer (0809) Graduate Programs: Integrated Circuit Science and Engineering (1401), Electronic Information (0854), Electronic Science and Technology (0809), Information and Communication Engineering (0810), and Computer Science and Technology (0812)	46-76	☆☆☆	Haidian District, Chaoyang District, Changping District, Tongzhou District, Daxing District, Beijing Economic-Technological

				etc.	Possess experience in module-level structural design, RTL implementation, and related verification processes; Be skilled in ModelSim, Synplify, ISE, VIVADO, and other tools; Have hands-on experience in chip tape-out and IP-level development.				Development Area, and Xicheng District
24		Chip manufacturing, and R&D of process technologies	R&D of technologies for advanced process techniques, characteristic manufacturing techniques and process optimization control, process integration technologies, emerging manufacturing technologies, etc.	Lithography engineer, chip process engineer, etching process engineer, ion implantation engineer, silicon photonic chip process engineer, process integration engineer, process development engineer, yield engineer, etc.	A candidate must: Possess experience in semiconductor lithography and demonstrate proficiency in semiconductor lithography processes; Be well-versed in various micro-/nano-fabrication techniques, including lithography, coating, etching, and ion implantation; Be proficient in SPC stability monitoring, Six Sigma, and other related systematic knowledge; Be familiar with optical theory, semiconductor manufacturing processes, and experimental design; Understand various failure analysis methods and equipment; Have relevant management experience in processes and raw materials; Be familiar with the silicon photonic integration process.	Undergraduate Programs: Electronic Information (0807), Materials (0804), Machinery (0802), and Physics (0702) Graduate Programs: Integrated Circuit Science and Engineering (1401), Electronic Information (0854), Electronic Science and Technology (0809), and Materials Science and Engineering (0805)	38-72	☆☆☆☆☆	Haidian District, Chaoyang District, Daxing District, Tongzhou District, Changping District, and Beijing Economic-Technological Development Area
25	Integrated circuit	R&D of chip packaging and system integration technologies	R&D of advanced packaging technologies, technologies for system in package (SIP), technologies for chip testing and verification, reliability technologies, etc.	Advanced packaging engineer, Chiplet integration engineer, chip packaging engineer, chip testing engineer, IC verification engineer, system packaging engineer, reliability engineer, etc.	A candidate must: Be familiar with chip packaging types, process flows, and key control points; Have experience in power supply and RF equipment packaging, as well as GaN silicon power device packaging; Be familiar with 3D stacking technologies and silicon photonic chip coupling and packaging; Be well-versed in using mainstream EDA simulation tools, including VCS and Verdi; Have mastered chip verification processes and UVM (Universal Verification Methodology); Be able to analyze mechanical and current distribution simulation results during packaging; Be skilled in advanced packaging technologies and multi-chip integration.	Undergraduate Programs: Electronic Information (0807), Automation (0808), Computer (0809), and Machinery (0802) Graduate Programs: Integrated Circuit Science and Engineering (1401), Electronic Information (0854), Electronic Science and Technology (0809), and Mechanical Engineering (0802)	36-66	☆☆☆	Haidian District, Chaoyang District, Changping District, Daxing District, Tongzhou District, and Beijing Economic-Technological Development Area
26		R&D of chip equipment and material technologies	R&D and manufacturing of critical domestic integrated device electronic equipment and core components,	Precision equipment mechanical design engineer, imaging system modeling engineer,	A candidate must: Be proficient in precision machinery product design and precision parts design; Be familiar with the structure and principles of	Undergraduate Programs: Machinery (0802), Electronic Information (0807), Materials (0804), Physics (0702), and Chemistry (0703)	25-43	☆☆☆	Haidian District, Chaoyang District,

			including ion implanters, plasma silicon etching machines, optical lenses, and laser light sources; R&D of wide-bandgap semiconductor materials, including gallium nitride (GaN) and silicon carbide (SiC); R&D of ultra-wide-bandgap semiconductor materials, including gallium oxide (Ga_2O_3); R&D of electron gases and wet electronic chemicals used in various manufacturing processes	photoelectric system design engineer, fluid engineer, optical design engineer, finite element analysis engineer, engineer for development of micro-/nano-semiconductor devices and processes, semiconductor modeling engineer, semiconductor material R&D engineer, etc.	common optical imaging systems; Be well-versed in the principles and applications of lasers, photoelectric sensors, optical fiber devices, and RF devices; Possess foundational knowledge of and skills related to detection and automation; Demonstrate proficiency in the principles and operation of RF testing and measurement instruments; Be skilled in modeling and analysis methods, including the feedback and control algorithms using Matlab; Have hands-on experience in core material R&D and mass production.	Graduate Programs: Mechanical Engineering (0802), Electronic Science and Technology (0809), Materials Science and Engineering (0805), and Chemical Engineering and Technology (0817)			Daxing District, Tongzhou District, Changping District, Fengtai District, Beijing Economic-Technological Development Area, and Shunyi District
27	Medicine and healthcare	R&D and production of biological products	R&D, clinical trials, registration, and production of antibodies, proteins, and other biological products; R&D, clinical trials, registration, and production of genetically engineered drugs, cell therapy drugs, vaccines, and other biological products	New biological drug R&D engineer, antibody/protein researcher, QA engineer, purification engineer, engineer for development of analytical methods, pharmaceutical product manager, gene sequencing/detection/synthesis operator, genetic information analyst, gene editing researcher, genetic diagnosis researcher, cell therapy researcher, microfluidics R&D engineer, cell preparation engineer, vaccine R&D engineer, PCR engineer, etc.	A candidate must: Possess expertise in relevant technologies, including those of monoclonal antibodies, protein engineering, and glycosylation; Understand cell construction, large-scale culture, optical imaging systems, etc.; Be familiar with new cell bioreactors, product purification, immune cell engineering, etc.; Possess the knowledge of viral vector construction, genome editing, genome analysis, etc.; Have experience in the development of microfluidic products; Be familiar with tumor cell culture, molecular diagnostic reagent development, etc.; Possess the knowledge of pharmaceutical regulations and clinical trial management processes.	Undergraduate Programs: Biomedical Engineering (0826), Basic Medicine (1001), Bioengineering (0830), and Biological Science (0710) Graduate Programs: Biomedical Engineering (0831), Biology and Medicine (0860), Bioengineering (0836), and Basic Medicine (1001)	18-36	☆☆	Daxing District, Haidian District, Changping District, Chaoyang District, Tongzhou District, and Beijing Economic-Technological Development Area

28		R&D of brain science and brain-computer interface technologies	Research on brain science theories and technologies; R&D of brain-computer interface technologies, and design of related products.	Brain science researcher, laboratory animal manager, brain-computer interface engineer, brain-computer interface product designer, etc.	A candidate must: Be able to independently manage and conduct brain science experimental projects; Be skilled in conducting technical research on relevant technologies, including those of bioelectric signal acquisition and analysis, simulated conduction, information transformation, deep brain stimulation, brain structure localization, nerve conduction replacement, etc.; Have mastered the operation of signal processing tools and be proficient in programming languages, including Matlab and Python; Be familiar with machine learning algorithms and experienced in mathematical modeling using large sample data; Be familiar with EEG processing algorithms and EEG signal feature extraction methods; Have extensive experience in experimental animal management, with the ability to independently develop rules and regulations for experimental animal facilities and conduct corresponding training.	Undergraduate Programs: Biological Science (0710), Biomedical Engineering (0826), Basic Medicine (1001), and Veterinary Medicine (0904) Graduate Programs: Biology (0710), Bioengineering (0836), Biomedical Engineering (0831), Basic Medicine (1001), and Veterinary Medicine (0906)	23-50	☆☆☆	Haidian District, Chaoyang District, Changping District, Daxing District, Beijing Economic-Technological Development Area, and Tongzhou District
29	Medicine and healthcare	R&D and application of cell and gene therapy technologies	Clinical research on stem cell therapy, and the development and production of relevant drugs; Clinical research on gene therapy, and the development and production of relevant drugs	Cell and gene therapy researcher, immune cell therapy engineer, stem cell therapy engineer, gene therapy engineer, engineer for R&D of cell and gene therapy drugs, etc.	A candidate must: Possess a deep understanding of cell and gene therapy; Have strong expertise in cellular immunology and gene editing; Possess research experience in engineered cell transformation; Have mastered experimental design, vector construction, and cell line development, as well as methods for experimental verification of gene editing efficiency and off-target effects, including target gene knockout, insertion, and point mutation; Be familiar with gene editing tool enzymes, as well as sgRNA, mRNA, and LNP technologies; Have mastered various analytical techniques, including molecular cloning, PCR, FACS, ELISA, Western blot, and other cellular-level experimental techniques; Be skilled in independently designing and executing experimental plans; Be able to analyze experimental results and conduct data mining.	Undergraduate Programs: Bioengineering (0830), Biological Science (0710), Biomedical Engineering (0826), and Basic Medicine (1001) Graduate Programs: Biology (0710), Biomedical Engineering (0831), Bioengineering (0836), Biology and Medicine (0860), and Basic Medicine (1001)	22-40	☆☆☆	Changping District, Haidian District, Daxing District, Chaoyang District, Tongzhou District, and Beijing Economic-Technological Development Area

30		R&D and application of synthetic biomedicine	Design optimization of drugs and enzymes; R&D and application of biosynthesis for new natural products and medicines	Senior expert in synthetic biology, synthetic biological drug development engineer, enzyme engineering R&D engineer, engineer for development of purification and refining processes	A candidate must: Possess relevant work experience in chemistry, biology, engineering, and medicine; Possess the knowledge of the latest developments and trends in synthetic biology; Be familiar with widely used synthetic biological technologies, including, but not limited to, gene (genome) editing, molecular biology, metabolic network analysis, RNA-seq, proteomics, and metabolomics; Be familiar with the development processes of synthetic biopharmaceutical products and possess experience in implementing synthetic biological projects, either independently or as the leader of a team; Possess extensive experience in the R&D of purification and refining processes for biological fermentation products.	Undergraduate Programs: Chemistry (0703), Bioengineering (0830), Biological Science (0710), Biomedical Engineering (0826), and Basic Medicine (1001) Graduate Programs: Chemical Engineering and Technology (0817), Biology (0710), Biomedical Engineering (0831), Bioengineering (0836), Biology and Medicine (0860), and Basic Medicine (1001)	21-38	☆☆	Haidian District, Changping District, Daxing District, Chaoyang District, Tongzhou District, and Beijing Economic-Technological Development Area
31		R&D and application of digital healthcare	Development of systems for remote diagnosis, treatment and health management; Application of AI technologies in the medical field; Construction of smart healthcare big data platforms	Medical imaging algorithm engineer, medical imaging cloud platform engineer, medical IT architect, medical software R&D engineer, online consultation product manager, medical operation expert, etc.	A candidate must: Be familiar with medical image transmission protocols; Be proficient in using software, including OHIF/3D Slicer/MITK for image file segmentation, with expertise in segmentation modules and their fundamental principles; Be well-versed in web development technologies, with the ability to develop systems using frameworks like React and AngularJS; Possess extensive experience in distributed queues, task distribution frameworks, large-scale data storage, and distributed storage technologies; Be familiar with various deep neural network algorithms (e.g., CNN, RBM, RCNN, and RNN) and their practical applications; Have experience in product design and operations for online consultation platforms.	Undergraduate Programs: Clinical Medicine (1002), Computer (0809), and Electronic Information (0807) Graduate Programs: Clinical Medicine (1002/1051), Computer Science and Technology (0812), Electronic Information (0854), Electronic Science and Technology (0809), and Information and Communication Engineering (0810)	21-40	☆☆☆☆☆	Haidian District, Chaoyang District, Fengtai District, Changping District, Daxing District, and Fangshan District

32		R&D and production of high-end medical devices	R&D, clinical trials, registration, and production of high-end digital imaging diagnostic equipment, interventional therapy equipment, cardiovascular and orthopedic medical devices, and medical robots	Medical device R&D engineer, medical device production engineer, medical device registration engineer, medical device after-sales engineer, medical device testing engineer, medical device product manager, technician for medical additive manufacturing projects, etc.	A candidate must: Have mastered the design and development technologies of medium- and high-end digital imaging diagnostic equipment, interventional therapy equipment, and cardiovascular and orthopedic medical devices; Be familiar with quality system standards and regulations for medical devices, including GSP, ISO13485, GMP, and CE; Be familiar with advancements in international advanced technologies, scientific research, and equipment production; Demonstrate expertise in additive manufacturing equipment, technologies, and product structure design; Have experience in designing medical devices, analytical instruments, and related products; Possess comprehensive knowledge of digital and analog circuits; Be well-versed in the performance principles of common electronic components; Be skilled in designing embedded systems; Be able to independently design mixed-signal circuit systems; Be able to independently design circuit schematics and printed circuit board (PCB) diagrams as required.	Undergraduate Programs: Medical Technology (1010), Materials (0804), Machinery (0802), Automation (0808), and Electronic Information (0807) Graduate Programs: Medical Technology (1058), Materials Science and Engineering (0805), Mechanical Engineering (0802), Control Science and Engineering (0811), and Electronic Science and Technology (0809)	17-34	☆☆	Haidian District, Chaoyang District, Changping District, Tongzhou District, Fengtai District, Shunyi District, and Beijing Economic-Technological Development Area
33	Intelligent manufacturing and equipment	R&D and manufacturing of intelligent robots	R&D and production of core robotic components, including controllers, servo motors, and speed reducers; R&D of intelligent robot algorithms, including those for motion control, posture control, trajectory planning, forward-looking control, and dynamics; Manufacturing of intelligent industrial, service, special, and humanoid robots	Intelligent robot algorithm engineer, intelligent robot application engineer, intelligent robot debugging engineer, intelligent robot integration engineer, intelligent robot system engineer, intelligent robot industrial software engineer, CNC system IoT engineer, engineer for software for intelligent robot motion control, senior vision software engineer in intelligent robotics, etc.	A candidate must: Be able to develop, design, and review intelligent robots and related equipment; Have mastered the structural design and optimization techniques for various types of intelligent robots; Have experience in the manufacturing and assembly processes of intelligent robots; Be familiar with control algorithms, trajectory planning, dynamic modeling, and other technologies for intelligent robots; Have experience in developing technologies, including those of speed detection, singularity detection, and joint overspeed processing; Understand the development of virtual prototype simulation technologies, process planning, and other applications; Be familiar with optimization control algorithms, including MPC (Model Predictive Control), WBC	Undergraduate Programs: Automation (0808), Computer (0809), Electronic Information (0807), and Interdisciplinary Engineering (0832) Graduate Programs: Control Science and Engineering (0811), Computer Science and Technology (0812), Electronic Information (0854), Electronic Science and Technology (0809), and Information and Communication Engineering (0810)	31-56	☆☆☆☆	Haidian District, Chaoyang District, Beijing Economic-Technological Development Area, Mentougou District, and Tongzhou District

					(Whole-Body Control), and intelligent robot gait generation methods; Have experience in dynamic parameter identification, compliance control, and the development of whole-body collaborative grasping algorithms; Be familiar with simulation software, including Matlab/Simscape, Webots, ROS/Gazebo, and Mujoco; Possess the knowledge of the development processes of intelligent hardware and robot products.				
34		Manufacturing of scientific instruments	Manufacturing of advanced optical instruments; Manufacturing of advanced experimental analysis and test instruments; Manufacturing of quantum computing instruments	Optical engineer, precision instrument assembly and debugging engineer, optical-mechanical system engineer, LIDAR system engineer, etc.	A candidate must: Possess a solid foundation in optical theoretical knowledge, including geometric optics, physical optics, laser technologies and principles, and optical detection technologies and methods; Be proficient in common optical design and mechanical design software, including Zemax, TracePro, and Pro-E; Have experience in developing optical detection instruments and platforms; Be skilled in optical design and optical path debugging; Have extensive experience in spectral measurement.	Undergraduate Programs: Machinery (0802), Instrument (0803), and Physics (0702) Graduate Programs: Mechanical Engineering (0802), Machinery (0855), Instrument Science and Technology (0804), and Physics (0702)	29-55	☆☆☆☆	Haidian District, Chaoyang District, Daxing District, Changping District, Shunyi District, Tongzhou District, and Beijing Economic-Technological Development Area
35		R&D and manufacturing of commercial spacecraft	R&D, production, and testing of commercial aerospace engines; Spacecraft manufacturing, and R&D of propulsion technologies	Aerospace propulsion engineer, aerospace simulation system engineer, rocket system engineer, aerospace structural mechanics engineer, aerospace thermal control engineer, overall satellite engineer, attitude and orbit control system engineer, comprehensive satellite testing engineer, assembly process engineer, etc.	A candidate must: Be familiar with the development processes, quality control, airworthiness systems, and standard frameworks for aerospace engines; Have experience in scheme design for model engine systems; Be proficient in the overall scheme design and simulation technologies of mechatronic systems for flight simulators; Have experience in developing flight control algorithms and implementing embedded software; Be well-versed in control algorithms, including those of navigation, guidance, and attitude control; Have mastered the development of 1553B, optical fiber, serial port, and Ethernet communication; Be familiar with the overall mechanical, electrical, and thermal technologies associated with	Undergraduate Programs: Aerospace (0820), Physics (0702), Computer (0809), and Machinery (0802) Graduate Programs: Aeronautical and Astronautical Science and Technology (0825), Physics (0702), Computer Science and Technology (0812), Mechanical Engineering (0802), and Machinery (0855)	27-49	☆☆☆	Haidian District, Daxing District, Fengtai District, Chaoyang District, Changping District, and Beijing Economic-Technological Development Area

					satellites; Be proficient in using MATLAB, STK and other software for attitude and orbit control simulation, and be familiar with the functions, performance, engineering applications, development, and production of standalone units and individual systems involved in attitude and orbit control; Be proficient in using test instruments, including oscilloscopes, power supplies, and multimeters; Be familiar with the use of CAD, Pro-E, SolidWorks, and similar software.				
36		R&D and manufacturing of low-altitude aircraft	Design and manufacturing of low-altitude aircraft, including unmanned aerial vehicles (UAVs), electric vertical take-off and landing (eVTOL) aircraft, helicopters, small fixed-wing aircraft; Testing and route operations of low-altitude aircraft	Low-altitude aircraft designer, low-altitude aircraft R&D engineer, low-altitude aircraft manufacturing engineer, low-altitude aircraft product manager, engineer for R&D of low-altitude aircraft scheduling platforms, test flight engineer, low-altitude general aviation flight program designer, UAV swarm flight planner, etc.	A candidate must: Be familiar with the system architecture and key technologies of low-altitude aircraft; Understand the development trends and the industry chains of the low-altitude economy and technologies both in China and the rest of the world; Possess strong technical R&D capabilities, including expertise in mechanical design, electronic hardware, and software programming; Have a deep understanding of flight and control principles; Be able to design low-altitude aircraft structures and systems, as well as conduct final assembly, commissioning, and troubleshooting; Possess the knowledge of laws, regulations, and safety standards related to low-altitude aircraft; Hold qualification(s) in the design, manufacturing, and testing of aircraft associated with the low-altitude economy; Be familiar with the principles, test processes, and communication interface test methods of avionics equipment; Have mastered structured method of system safety analysis and evaluation; Understand the layout and construction planning of low-altitude infrastructure, the airspace and route planning, and the take-off and landing point planning for low-altitude flights; Be familiar with the development, maintenance, and operation of low-altitude aircraft flight simulation systems; Possess skills and experience in designing, optimizing, and managing coordinated flight operations of multiple UAVs.	Undergraduate Programs: Aerospace (0820), Weapon (0821), Computer (0809), Machinery (0802), Mechanics (0801), Electronic Information (0807), Automation (0808), and Mathematics (0702) Graduate Programs: Aeronautical and Astronautical Science and Technology (0825), Armament Science and Technology (0826), Mechanical Engineering (0855), Intelligent Science and Technology (1405), and Remote Sensing Science and Technology (1404)	21-47	☆☆☆☆	Haidian District, Fengtai District, Beijing Economic-Technological Development Area, Changping District, Chaoyang District, and Yanqing District

37	Intelligent manufacturing and equipment	Design and manufacturing of smart rail transit systems	Manufacturing of high-speed rail equipment and accessories; Manufacturing of urban rail transit equipment; R&D and application of smart transportation systems	BIM design engineer, rail transit signal design engineer, train control design engineer, pattern recognition engineer, smart transportation platform product manager, smart transportation algorithm engineer, etc.	A candidate must: Possess experience in data design, system design, and engineering design for train control and signal systems; Be familiar with basic processes related to system testing, commissioning, acceptance, and on-site coordination; Have experience in developing smart transportation algorithms; Have experience in the application of building information modeling (BIM) technologies in the rail transit sector.	Undergraduate Programs: Transportation (0818), Automation (0808), Electronic Information (0807), and Computer (0809) Graduate Programs: Transportation Engineering (0823), Control Science and Engineering (0811), Electronic Information (0854), Electronic Science and Technology (0809), and Information and Communication Engineering (0810)	23-44	☆☆☆☆☆	Haidian District, Chaoyang District, Dongcheng District, Xicheng District, Daxing District, and Shijingshan District
38	Green energy, energy conservation and environmental protection	R&D and application of low-carbon technologies	Construction of systems for calculation, evaluation, and trading of carbon emissions, and carbon asset management; R&D and application of materials and technologies for carbon capture and storage	Carbon emission control R&D engineer, carbon emission monitor, carbon dioxide peaking and carbon neutrality planner, carbon emission trader, carbon asset manager, carbon accountant, carbon capture R&D engineer, carbon capture utilization engineer, carbon storage R&D engineer, carbon storage and utilization device engineer, etc.	A candidate must: Possess the ability to develop low-carbon technologies; Understand laws, regulations, and policies related to carbon emission management; Be familiar with the development and operation of China's carbon market and master carbon emission calculation methods for enterprises and public institutions, as well as the construction and operation of carbon emission management systems in the country; Demonstrate expertise in greenhouse gas emission verification standards and processes, along with verification strategies for enterprises; Have mastered carbon emission trading systems, as well as quota verification and allocation methods of carbon markets; Demonstrate proficiency in carbon trading accounting treatment, the management methods for carbon finance and carbon asset, as well as the construction of carbon asset management systems for enterprises and public institutions; Be skilled in formulating carbon dioxide peaking and carbon neutrality plans for enterprises.	Undergraduate Programs: Environmental Science and Engineering (0825), Economics (0201), and Science of Finance (0203) Graduate Programs: Environmental Science and Engineering (0830), Theoretical Economics (0201), Applied Economics (0202), and Finance (0251)	21-38	☆☆☆	Chaoyang District, Haidian District, Fengtai District, Xicheng District, Dongcheng District, and Daxing District

39		R&D and application of hydrogen energy technologies	R&D of hydrogen energy preparation, storage, transportation, refueling, and system integration technologies; R&D of hydrogen energy materials; R&D of advanced hydrogen energy equipment.	Hydrogen energy R&D engineer, hydrogen energy product design engineer, hydrogen energy system engineer, hydrogen energy technologies specialist, etc.	A candidate must: Understand knowledge related to hydrogen energy storage and fuel cell power generation; Possess the knowledge of the hydrogen energy industry and relevant standards and regulations; Be familiar with the various processes involved in hydrogen energy production, storage, transportation, refueling, and usage; Possess research experience in water electrolysis for hydrogen production and related hydrogen energy technologies; Be skilled in operating electrochemical experimental equipment and utilizing electrochemical characterization methods; Have experience in the R&D of catalysts, electrodes, and electrolysis processes;	Undergraduate Programs: Energy and Power (0805), Environmental Science and Engineering (0825), Materials (0804), and Electrical (0806) Graduate Programs: Energy and Power (0858), Environmental Science and Engineering (0830), Materials Science and Engineering (0805), and Electrical Engineering (0808)	24-46	☆☆☆	Haidian District, Chaoyang District, Beijing Economic-Technological Development Area, Fengtai District, Dongcheng District, and Fangshan District
40		R&D of technologies and facilities for new energy storage	R&D of technologies, materials, and equipment for new flow batteries, compressed air, superconducting, liquid metal, solid-state batteries, and hydrogen energy storage	Energy storage engineer, energy storage software system engineer, energy storage operation and maintenance engineer, energy storage product manager, energy storage facility structure designer, energy storage scheme designer, etc.	A candidate must: Understand industrial trends and be familiar with battery energy storage technologies and advancements in cutting-edge energy storage products; Be familiar with the structure, electrical diagrams, and other related aspects of battery systems; Possess the knowledge of microgrid and large-scale energy storage system structures; Understand the R&D methods for key equipment, including battery cells, battery management system (BMS), and power conversion system (PCS) in battery energy storage power stations; Be familiar with IT software and hardware development processes; Be familiar with bidirectional converters, BMS, energy management system (EMS), battery packs (PACK), and power distribution equipment, as well as the use of CAD for drawing design; Have mastered the maintenance, installation, and commissioning methods for integrated energy storage systems.	Undergraduate Programs: Energy and Power (0805), Environmental Science and Engineering (0825), Materials (0804), and Electrical (0806) Graduate Programs: Energy and Power (0858), Environmental Science and Engineering (0830), Materials Science and Engineering (0805), and Electrical Engineering (0808)	20-40	☆☆☆☆	Haidian District, Chaoyang District, Fengtai District, Tongzhou District, Daxing District, and Fangshan District

41	Green energy, energy conservation and environmental protection	Development of environmental, social and governance (ESG) system	Construction of a regulatory system for ESG information disclosure standards and assurance systems; Theoretical research and practical application of ESG	ESG consultant, ESG investment analyst, ESG project manager, ESG research specialist, ESG product manager, etc.	A candidate must: Understand the relevant ESG sustainability policy requirements in China and the rest of the world, and be familiar with international ESG sustainability organizations, including the United Nations system and ESG rating agencies, with the ability to conduct benchmarking and research; Be familiar with ESG disclosure standards, GRI standards, SASB, TCFD, and other sustainability-related guidelines, as well as capital market rating requirements from organizations like MSCI and S&P Global, and be able to support ESG information disclosure processes and improve indicator systems; Demonstrate the ability to implement ESG projects.	Undergraduate Programs: Economics (0201), Science of Finance (0203), Business Administration (1202), Public Administration (1204), and Environmental Science and Engineering (0825) Graduate Programs: Applied Economics (0202), Finance (0251), Science of Business Administration (1202), Science of Public Administration (1204), and Resource and Environment (0857)	18-36	☆☆☆☆	Chaoyang District, Haidian District, Dongcheng District, Tongzhou District, and Fengtai District
42	Intelligent connected vehicles	R&D and testing of powertrain systems for new energy vehicles	R&D and testing of technologies in key areas, including vehicle integration design, electromechanical coupling, three-in-one electric drive assemblies, and the performance of drive motors and controllers	Vehicle integration engineer, battery, motor and electronic control system integration engineer, electric drive assembly integration development engineer, charging integration development engineer, electrical automation engineer, electric drive development engineer, motor development engineer, simulation test engineer, controller test engineer, vehicle electronic control test engineer, drive development engineer, etc.	A candidate must: Be skilled in building MiL, SiL, HiL, and other controller test environments; Be well-versed in the development methodologies for key controllers including VCU and TCU; Demonstrate proficiency in the system architecture of STM32, Freescale, NXP, and other MCU series, as well as a solid understanding of ARM processor system architecture; Possess a solid foundation in automatic control principles, and the operating principles of brushless motors and permanent magnet synchronous motors, and master algorithms including FOC, MRAS, and PWM; Be familiar with MCU software development, and master the development of drivers for UART, I2C, CAN, SPI, and other interfaces; Possess the knowledge of design digital and analog circuits, as well as microwave and RF design.	Undergraduate Programs: Machinery (0802), Electrical (0806), and Automation (0808) Graduate Programs: Mechanical Engineering (0802), Machinery (0855), Electrical Engineering (0808), and Control Science and Engineering (0811)	24-48	☆☆☆☆	Haidian District, Chaoyang District, Beijing Economic-Technological Development Area, Shunyi District, and Tongzhou District
43		R&D of technologies for lithium-ion and sodium-ion batteries	R&D of materials and technologies for lithium-ion and sodium-ion batteries; R&D of solid-state lithium-ion batteries; R&D of technologies concerning processes and methods of manufacturing batteries;	Charging pile R&D engineer, lithium-ion/sodium-ion battery engineer, solid-state lithium-ion battery process R&D engineer, cell R&D engineer, cell quality engineer, battery	A candidate must: Possess experience in the R&D and testing of lithium-ion/sodium-ion and solid-state batteries, and be familiar with battery production processes, structural design, and protection circuits; Be proficient in batteries' material formulations and testing processes, and possess an understanding of the factors influencing battery performance;	Undergraduate Programs: Chemistry (0703), Materials (0804), Electrical (0806), Physics (0702), and Electronic Information (0807) Graduate Programs: Chemistry (0703), Chemical Engineering and Technology (0817), Materials and Chemical Engineering (0856), Physics	20-40	☆☆☆☆	Chaoyang District, Haidian District, Daxing District, Fengtai District, Shunyi

			R&D of battery safety and quality management technologies	algorithm engineer, battery test engineer, BMS software engineer, stack R&D engineer, battery safety engineer, battery system integration engineer, etc.	Possess a solid foundation in solid-state lithium-ion battery technologies, key material characteristics, assembly processes, and thermal management system development; Have mastered battery pack design, BMS development, and battery module testing; Possess the knowledge of the design of electric vehicle battery systems, as well as the structures and electrical specifications of microgrids and large-scale energy storage systems; Demonstrate the ability to address issues associated with battery system interfaces and coupling.	(0702), and Electronic Information (0854)			District, Fangshan District, and Beijing Economic-Technological Development Area
44		R&D and application of intelligent driving systems	R&D of perception, decision-making, control, and security systems for intelligent driving; Intelligent cabin design and testing, and R&D of human-computer interaction technologies	Intelligent driving algorithm engineer, system integration design engineer, intelligent driving simulation test engineer, intelligent cabin designer, intelligent cabin development engineer, intelligent cabin test engineer, embedded software development engineer, front-end development engineer, etc.	A candidate must: Have an understanding of vehicle engineering, AI, software engineering, computers, electronics, GIS, surveying and mapping, automation, and related fields; Possess the knowledge of various sensors, intelligent driving technology frameworks, and software and hardware architectures; Be familiar with multi-sensor fusion algorithms, including extended Kalman filter, particle filter, and graph optimization algorithms, as well as localization algorithms including ICP, NDT, and LOAM; Demonstrate the ability to develop, validate, test, and apply autonomous driving decision-making and planning algorithms (e.g., behavioral decision-making, scenario-based decision-making, path planning, and speed planning algorithms); Have expertise in the development, integration, and implementation of products, including ADAS; Be familiar with relevant testing standards and regulations, including ISO, Euro NCAP, and CNCAP; Possess the knowledge of computer graphics theory, with experience in OpenGL-related development, and high-precision mapping technologies or formats; Be familiar with the functionalities of intelligent cabin systems.	Undergraduate Programs: Computer (0809), Electronic Information (0807), Automation (0808), and Machinery (0802) Graduate Programs: Computer Science and Technology (0812), Electronic Science and Technology (0809), Information and Communication Engineering (0810), Control Science and Engineering (0811), and Intelligence Science and Technology (1405)	24-57	☆☆☆☆☆	Haidian District, Chaoyang District, Shunyi District, Daxing District, Beijing Economic-Technological Development Area, Dongcheng District, and Shunyi District

45	Intelligent connected vehicles	R&D and application of technologies for intelligent connected vehicles	R&D and application of V2X vehicle terminals, IoV communication, and other technologies for the R&D, testing, and evaluation of intelligent connected vehicles	IoV system engineer, intelligent connected system security engineer, interaction test engineer, communication protocol engineer, system integration engineer, etc.	A candidate must: Be familiar with in-vehicle network communication protocols (e.g., CAN, Ethernet, UDS, Bluetooth, and WIFI); Possess the knowledge of C-V2X-related international and Chinese standards, along with experience in embedded software development and debugging, as well as in the development of LTE-V2X/NR-V2X chip module or terminal devices; Be skilled in common encryption algorithms and security protocols, with experience in building, operating, and maintaining certification systems, including PKI, CA, RA, and OCSP; Be proficient in using common testing tools and instruments, including Wireshark, OmniPeek, Vector, and Keysight, and have hands-on experience in road testing or simulation testing.	Undergraduate Programs: Computer (0809), Electronic Information (0807), Automation (0808), Transportation (0818), and Machinery (0802) Graduate Programs: Computer Science and Technology (0812), Electronic Science and Technology (0809), Information and Communication Engineering (0810), Transportation Engineering (0823), and Intelligence Science and Technology (1405)	20-42	☆☆☆☆☆	Haidian District, Chaoyang District, Xicheng District, Shunyi District, Daxing District, Shijingshan District, and Tongzhou District
46	New materials	R&D and application of cutting-edge new materials	R&D and application of new materials, including high-performance membrane materials, polymer photelectromagnetic materials, nanomaterials, graphene materials, advanced non-ferrous metal materials, special metal functional materials, high-end metal structural materials, advanced polymer materials, new inorganic non-metallic materials, high-performance fibers and composite materials, and cutting-edge new materials	Material R&D engineer, material application engineer, technical support engineer, etc.	A candidate must: Have mastered the technologies for the R&D and application of new materials that align with job requirements, including high-performance membrane materials, polymer photelectromagnetic materials, nanomaterials, graphene materials, advanced non-ferrous metal materials, special metal functional materials, high-end metal structural materials, advanced polymer materials, new inorganic non-metallic materials, high-performance fibers and composite materials, and cutting-edge new materials.	Undergraduate Programs: Materials (0804), Chemical and Pharmaceutical (0813), Machinery (0802), Chemistry (0703), and Biological Science (0710) Graduate Programs: Materials Science and Engineering (0805), Materials and Chemical Engineering (0856), Chemical Engineering and Technology (0817), and Nanoscale Science and Technology (1406)	18-40	☆☆☆	Haidian District, Chaoyang District, Daxing District, Fengtai District, Tongzhou District, and Beijing Economic-Technological Development Area

47	Modern agriculture	Crop breeding R&D	Research for breakthroughs in core and key technologies in genomics, phenomics, gene editing, heterosis, seed industry information, trait development, etc.; Technological reserve and innovation in breeding by molecular design	Crop breeding specialist, breeding R&D engineer, etc.	A candidate must: Possess extensive experience in applying cutting-edge international breeding technologies, demonstrate a unique and profound understanding of the seed market, and be skilled in developing technological approaches for breeding and implementation plans tailored to diverse market needs; Be experienced in managing the full lifecycle of breeding experiments, with the ability to lead teams in critical tasks, including fertility observation and collaborative hybridization; Be proficient in key relevant areas, including whole-genome selection, trait analysis, SNP marker development and genotyping, molecular marker-assisted breeding application, gene/QTL mapping and cloning, various sequencing techniques and their applications, data analysis, and breeding documentation.	Undergraduate Programs: Plant Production (0901) and Biological Science (0710) Graduate Programs: Crop Science (0901), Agricultural Resources and Environment (0903), Agriculture (0951), Biology (0710), and Bioengineering (0836)	15-32	☆☆	Haidian District, Changping District, Daxing District, Pinggu District, Tongzhou District, and Yanqing District
48	Technology services	Intellectual property services	Patent agency, evaluation, operation, consulting, and other related services; Trademark agency, evaluation, inquiry, review, and other related services; Copyright agency, appraisal, consulting, and other related services; Collection and transfer services of copyright use remuneration; Intangible asset evaluation services	Patent engineer, patent agent, IP consultant, IP lawyer, IP analyst, IP management system auditor, patent drafting specialist, etc.	A candidate must: Possess extensive experience in patent retrieval, patent application drafting, response to patent examination opinions, and patent reexaminations; Be familiar with the *Patent Law of the People's Republic of China* and be able to manage IP-related litigation; Possess extensive experience in IP consulting, agency, operation, information application, and development of IP protection strategies.	Undergraduate Programs: Legal Science (0301), Economics (0201), and Business Administration (1202) Graduate Programs: Legal Science (0301), Applied Economics (0202), Science of Business Administration (1202), Business Administration (1251), and Asset Evaluation (0256)	18-43	☆☆☆	Chaoyang District, Haidian District, Fengtai District, Changping District, Xicheng District, and Daxing District
49	Technology services	Business incubation services	Business incubation services, including office space leasing, investment and financing consulting, and financial and legal agency services.	Business incubation consultant, investment manager, etc.	A candidate must: Possess relevant management and operational experience in business incubation institution(s); Demonstrate expertise in business strategic planning and consulting; Have experience in venture capital investments, financial advisory services, and private equity investments.	Undergraduate Programs: Legal Science (0301), Economics (0201), Science of Finance (0203), and Business Administration (1202) Graduate Programs: Legal Science (0301), Applied Economics (0202), Finance (0251), Science of Business Administration (1202), and Business Administration (1251)	17-36	☆	Chaoyang District, Haidian District, Xicheng District, Dongcheng District, and Fengtai District

50		Services for the transfer and commercialization of scientific and technological achievements	Investment, evaluation, and commercialization services for scientific and technological achievements; Technology transfer services	Technical manager, scientific and technological achievement verification engineer, manager for products of commercialization of scientific and technological achievements, etc.	A candidate must: Possess a professional background related to the commercialization and application of scientific and technological achievements; Demonstrate legal enforcement capabilities and familiarity with IP-related processes and operations; Be skilled in coordination and negotiation, with expertise in technology transaction procedures; Possess strong skills in data collection and analysis.	Undergraduate Programs: Legal Science (0301), Economics (0201), and Business Administration (1202) Graduate Programs: Legal Science (0301), Applied Economics (0202), Science of Business Administration (1202), Business Administration (1251), and Asset Evaluation (0256)	19-44	☆☆☆	Haidian District, Chaoyang District, Xicheng District, Fengtai District, and Changping District
51	Business services	Development of an international commercial arbitration center	Arbitration of international commercial disputes	Foreign-related arbitrator, dispute resolution lawyer, international trade dispute resolution specialist, arbitration practitioner, international arbitration research specialist, arbitration secretary, etc.	A candidate must: Be proficient in international and Chinese arbitration laws and regulations; Be familiar with international commercial arbitration rules and possess professional knowledge of international commercial arbitration; Possess hands-on experience in arbitration, along with the capability of conducting research on the arbitration sector; Possess the knowledge of the differences in arbitration systems across various countries; Exhibit excellent learning, communication, analytical, judgment, and problem-solving skills, as well as a solid foundation in project management; Be proficient in using English as a working language, with expertise in international trade laws and regulations; Demonstrate exceptional communication and negotiation skills.	Undergraduate Programs: Legal Science (0301), Economics and Trade (0204), Foreign Languages and Literatures (0502), Business Administration (1202), Science of Finance (0203), Computer (0809), Journalism and Communication (0503), and Economics (0201) Graduate Programs: Legal Science (0301), Law (0351), International Affairs (0355), Applied Economics (0202), and Foreign Languages and Literatures (0502)	Compensation is not calculated based on an annual salary.	☆☆☆	Chaoyang District, Haidian District, Xicheng District, Dongcheng District, Daxing District, and Tongzhou District
52		HR technical services	Application of new-generation information technologies in HR services, including fields such as recruitment, headhunting, performance evaluation, and skills training	Senior recruitment specialist, organizational development specialist, performance-based pay specialist, HR digital product manager, HR data analyst, enterprise HR manager, corporate culture manager, etc.	A candidate must: Possess extensive professional expertise in HR management, including headhunting, talent training, performance management, talent mapping, organizational development, employee experience, and organizational network analysis; Be familiar with common HR management tools; Possess skills in HR data analysis; Have the ability to build HR systems.	Undergraduate Programs: Public Administration (1204), Economics (0201), Business Administration (1202), and Psychology (0711) Graduate Programs: Science of Public Administration (1204), Applied Economics (0202), Science of Business Administration (1202), Psychology (0402), and Applied Psychology (0454)	16-37	☆☆	Chaoyang District, Haidian District, Dongcheng District, Tongzhou District, and Fengtai District

53	Financial services	Construction of a national financial management center	Research and formulation of standards for the financial industry; International finance, cross-border investment and financing, and cross-border capital flow services; Financial regulation, financial risk monitoring and early warning, and establishment of a financial legal framework; Development of international financial cooperation	Financial risk control/compliance specialist, high-level specialist in financial valuation/quantitative trading/asset allocation, cross-border/boundary asset specialist, legal adviser in cross-border/boundary investment and financing, financial industry policy researcher, financial standard setting specialist, investment and financing analyst, international financial cooperation and exchange specialist, foreign exchange trading specialist, etc.	A candidate must: Possess expertise in the financial industry and data governance systems, with a comprehensive understanding of international financial landscapes, policies, and guidelines; Have a deep understanding of cross-border/boundary financial products and extensive experience in cross-border/boundary investment and financing; Be familiar with China's regulations on cross-border/boundary capital flows, with the ability to monitor international financial standards and facilitate alignment between Chinese and international standards; Hold recognized financial certification(s), both domestically and internationally, including those of Chartered Financial Analyst (CFA) and Financial Risk Manager (FRM); Be proficient in financial regulations and risk-based supervision; Be familiar with international cooperation mechanisms and skilled in managing international cooperation projects, including planning, resource coordination, progress tracking, risk management, and evaluation.	Undergraduate Programs: Computer (0809), Science of Finance (0203), Electronic Information (0807), Business Administration (1202), Economics and Trade (0204), Statistics (0712), and Mathematics (0701) Graduate Programs: Finance (0251), Electronic Information (0854), Science of Business Administration (1202), Applied Economics (0202), and Applied Statistics (0252)	23-49	☆☆☆☆	Chaoyang District, Haidian District, Xicheng District, Dongcheng District, Fengtai District, and Shijingshan District
54	Financial services	Construction of a global center for green and sustainable finance	Financial products and services, including green credit, green insurance, green funds, and green trusts; Development of international cooperation in green finance; Construction of a standard framework for green finance	Green finance policy and strategy specialist, green finance product manager, green finance analyst, green finance marketing specialist, green finance product R&D specialist, etc.	A candidate must: Understand and embrace the concept of sustainability, with comprehensive and in-depth knowledge of green finance products, environmental benefit calculations, and climate risks; Possess skills in strategic planning, data analysis, and evaluation; Have a deep understanding of, and experience in, the green finance market, the issuance process of green bonds, policies and regulations related to green finance products, and market trends; Be capable of transforming digital products and ESG databases into financial businesses while expanding application scenarios within the financial industry; Possess keen insight into market demands and the industry's development trends; Be able to design and develop financial products, including green credit, green bonds, and green funds.	Undergraduate Programs: Science of Finance (0203), Electronic Information (0807), Business Administration (1202), Economics and Trade (0204), and Environmental Science and Engineering (0825) Graduate Programs: Finance (0251), Electronic Information (0854), Science of Business Administration (1202), Applied Economics (0202), and Environmental Science and Engineering (0830)	21-44	☆☆☆☆	Chaoyang District, Haidian District, Tongzhou District, Xicheng District, Daxing District, and Dongcheng District

55		Construction of a fintech innovation center	Construction of a modern digital finance system; R&D and innovation of digital finance technologies; Construction of a full-scenario digital finance platform and relevant applications; Establishment of a regulatory framework for digital finance; Development of financial infrastructure empowered by technologies	Financial cloud platform engineer, financial data distributed computing engineer, financial system architect, financial data product manager, specialist in planning for financial digital products, specialist in trading system technologies, engineer for algorithms for financial product recommendations, specialist in digital currency risk control, digital currency quantitative researcher, etc.	A candidate must: Have mastered the foundational technologies in digital finance, including big data, cloud computing, blockchain, privacy computing, and quantum technologies; Be familiar with general financial technologies, including those of payment, transaction, digital identity authentication, financial risk management, and anti-money laundering; Possess experience in product design and technology R&D for general digital finance scenarios; Have a deep understanding of the latest developments and trends in digital finance.	Undergraduate Programs: Science of Finance (0203), Computer (0809), Electronic Information (0807), Mathematics (0701), and Statistics (0712) Graduate Programs: Finance (0251), Computer Science and Technology (0812), Electronic Information (0854), Mathematics (0701), and Applied Statistics (0252)	24-50	☆☆☆☆	Chaoyang District, Haidian District, Xicheng District, Dongcheng District, Fengtai District, and Shijingshan District
56	Culture and tourism	Development of copyrighted works of digital art	Integration of art design with information technologies for the design, production, and distribution of digital cultural and artistic products across various media, platforms, and frameworks; Development of creative cultural products that incorporate Chinese elements and distinctive Beijing characteristics; Utilization of AI technologies to design and create copyrighted works of digital art	Digital landscape painter, DIT engineer, digital media designer, vision art designer, planner for creative cultural copyrighted works, curator of exhibitions of creative cultural products, AI concept artist, game concept artis (AI drawer), planner and operator for creative cultural products, etc.	A candidate must: Possess excellent visual storytelling skills, originality, and a strong artistic foundation; Be proficient in using AI-powered drawing tools, including Stable Diffusion, Midjourney, and DALL-E2; Be skilled in mapping, modeling, and post-synthesis software; Be adept at utilizing various design software and common prototyping tools; Demonstrate strong creative thinking and comprehension abilities, with a focus on user experience; Exhibit a refined aesthetic sense and a keen awareness of trends in popular culture within the art domain; Possess keen insight into the needs of the cultural market, with the ability to identify high-quality copyrighted franchises and develop themed project plans; Possess experience in conducting in-depth research on specific cultural and artistic themes and curating large-scale themed exhibitions.	Undergraduate Programs: Computer (0809), Design Science (1305), Fine Arts (1304), Drama and Film Studies (1303), and History (0601) Graduate Programs: Computer Science and Technology (0812), Design Science (1403), Fine Arts and Calligraphy (1356), Drama and Film Studies (1354), and Museum Science (0651)	15-30	☆☆☆☆	Chaoyang District, Haidian District, Dongcheng District, Xicheng District, Fengtai District, Shijingshan District, and Huairou District

57	Culture and tourism	Development of characteristic tourism resources	In-depth development of culture and tourism brands with distinctive Beijing characteristics	Senior travel planner, senior travel advisor, etc.	A candidate must: Possess extensive experience in geographical locations, cultural heritage, and the combination and planning of space-time resources; Possess keen insight into local culture; Be able to develop high-quality copyrighted franchises based on location-specific resources and market demand.	Undergraduate Programs: Tourism Management (1209), Geographical Science (0705), and History (0601) Graduate Programs: Tourism Management (1254), Geography (0705), Chinese History (0602), and Museum Science (0651)	11-20	☆	Chaoyang District, Dongcheng District, Shijingshan District, Yanqing District, Mentougou District, Huairou District, Miyun District, and Pinggu District
58		Planning and operation of large-scale exhibitions and performances	In-depth development of exhibition business, new performing arts spaces, and high-quality repertoires with distinctive Beijing characteristics	Exhibition brand incubation designer, exhibition planner, exhibition budget planner, performing arts planner, etc.	A candidate must: Possess keen insight into market demand and changes, industry trends, and development directions, with the ability to align market needs with industrial developments to create and nurture high-quality exhibition brands; Be proficient in using 3DMAX, CAD, PS, and other related software; Demonstrate strong organizational and management skills in overseeing exhibition sites; Be familiar with industry-related policies and maintain a network of upstream and downstream resources within the exhibition sector, including construction enterprise resources and integration expertise; Exhibit strong business negotiation, organizational, and coordination skills, along with the ability to work under pressure.	Undergraduate Programs: Journalism and Communication (0503), Art Theory (1301), Design Science (1305), Business Administration (1202), and History (0601) Graduate Programs: Journalism and Communication (0503), Design Science (1403), Arts Studies (1301), Chinese History (0602), and Museum Science (0651)	12-21	☆☆	Chaoyang District, Haidian District, Fengtai District, Dongcheng District, Tongzhou District, Huairou District, and Shunyi District

II. Catalog of Skilled Talent in Demand

S/N	Industry	Job Title	Occupation (Job Types) Code	Basic Description	Reference Median of Annual Salary (10,000 Yuan)	Rating of Shortage and Urgency for Occupation/Job Types	Key Regions with Demands
1	New-Generation Information Technology	Network and Information Security Administrator (S)	4-04-04-02	Responsible for network and information security management, protection, and monitoring.	18.7	Severe Shortage and Urgency	Haidian District, Xicheng District, Chaoyang District, Changping District, Dongcheng District, etc.
2		Digital Solution Designer (S)	4-04-04-05	Responsible for analyzing and identifying industrial digitalization requirements, formulating digital solutions, and providing technical support for project implementation and operations.	24.1	Critical Shortage and Urgency	
3		Cryptographic Technology Application Specialist (S)	4-04-04-06	Responsible for application technology services related to cryptographic security, including architecture design, system integration, testing & evaluation, operation & maintenance management, and cryptographic consulting for information systems.	14.4	Critical Shortage and Urgency	
4		Cybersecurity Classified Protection Evaluator (S)	4-04-04-07	Utilize relevant technologies, methodologies, and tools to conduct security technology and security management assessments on network systems and data, in accordance with national cybersecurity classified protection laws, regulations, and technical standards.	21.5	Severe Shortage and Urgency	
5		Cloud-Network Intelligent Operation and Maintenance Engineer (S)	4-04-05-12	Engage in the operation and maintenance of cloud-network related service systems. Apply cloud computing and intelligent network technologies and tools to perform daily cloud-network management, operation & maintenance, performance optimization, troubleshooting, and emergency response.	22.8	Moderate Shortage and Urgency	
6		Industrial Internet Operation and Maintenance Engineer (S)	4-04-05-14	Use software, specialized equipment, testing instruments, and tools to perform tasks on industrial internet systems, including network interconnectivity, data acquisition & processing, identification resolution application, platform application optimization, and system security maintenance.	22.9	Moderate Shortage and Urgency	
7		Building Information Modeling (BIM) Technician (L/S)	4-08-08-23	Use computer software to conduct simulated construction in the engineering practice process and improve the engineering procedures in the whole process.	17.1	Critical Shortage and Urgency	
8		Internet of Things (IoT) Installation and Debugging Technician	6-25-04-09	Use testing instruments and specialized tools to install, configure, and debug IoT products and devices.	18.4	Severe Shortage and Urgency	
9	Artificial Intelligence	Artificial Intelligence Trainer (S)	4-04-05-05	Use intelligent training software to perform database management for AI products, configure algorithm parameters, design Human-AI interactions, and conduct performance testing and tracking.	13.5	Severe Shortage and Urgency	Xicheng District,

10		Generative AI System Application Specialist (S)	4-04-05-13	Utilize generative AI technologies and tools to execute system design and deployment, conduct model training and optimization, and perform system maintenance and management.	22.6	Critical Shortage and Urgency	Haidian District, Fengtai District, Chaoyang District, Daxing District, Economic-Technological Development Area, etc.
11		Generative AI Animation Production Practitioner	4-13-02-02	Operate generative AI tools to accomplish in-between animation drawing, line tracing and coloring, music/sound effects production, digital visual effects, post-production compositing, and video editing tasks.	17.7	Severe Shortage and Urgency	
12	Pharmaceutical and Health	Pharmaceutical Inspector	4-08-05-04	Responsible for inspecting, testing, verifying, measuring, analyzing finished pharmaceutical products (APIs, finished dosage forms), intermediates, raw materials and excipients, and packaging materials.	10.3	Severe Shortage and Urgency	Haidian District, Daxing District, Fengtai District, Changping District, Shunyi District, Economic-Technological Development Area, etc.
13		Chemical Synthesis Pharmaceutical Worker	6-12-01-00	Operate equipment such as reactors, centrifuges, filter presses to control chemical reactions and unit operations for the production of active pharmaceutical ingredients (APIs) and intermediates.	13.1	Moderate Shortage and Urgency	
14		Pharmaceutical Preparation Worker	6-12-03-00	Use formulation equipment and utensils to process raw materials and excipients into finished pharmaceutical products.	10.5	Severe Shortage and Urgency	
15		Biochemical Pharmaceutical Manufacturing Technician	6-12-05-01	Use equipment and tools, employing biological or semi-synthetic chemical techniques, to extract raw materials from animals, plants, and microorganisms to produce natural medicines.	12.2	Severe Shortage and Urgency	
16		Fermentation Engineering Pharmaceutical Engineer	6-12-05-02	Operate fermentation, sterilization, and separation equipment to perform strain cultivation, product fermentation, extraction and purification, and enzymatic cleavage of antibiotics to produce fermentation-based pharmaceuticals.	14.6	Severe Shortage and Urgency	
17		Blood Product Worker	6-12-05-04	Operate filtration, freezing, and separation equipment to isolate and purify cellular components and plasma protein fractions from blood for the production of blood products.	10.3	Severe Shortage and Urgency	
18		Genetic Engineering Pharmaceutical Production Engineer	6-12-05-05	Use gene splicing technology, recombinant DNA technology, and related equipment to produce pharmaceuticals.	12	Moderate Shortage and Urgency	
19		Medical Material Product Manufacturing Worker	6-21-06-04	Use tools and equipment to process medical materials (metal, polymer, ceramic, etc.) into products such as implantable devices, medical dressings, contraceptive devices, surgical invasive instruments, and catheters.	9.8	Severe Shortage and Urgency	
20		Cellular Quality Inspector	—	Responsible for cell-based quality control testing, including cell culture, cell-based immunofluorescence assays, flow cytometry, or ELISA assays.	13.2	Moderate Shortage and Urgency	
21		Medical Device Quality Inspector	—	Use tools, instruments, and equipment to perform quality inspection and testing on medical devices.	11.6	Severe Shortage and Urgency	
22		Antibody Drug Product Engineer	—	Produce therapeutic biologics such as monoclonal antibodies (mAbs), bispecific antibodies (BsAbs), and antibody-drug conjugates (ADCs).	15.8	Critical Shortage and Urgency	
23		New Drug Pharmacological Laboratory Technician	—	Responsible for conducting experiments and safety evaluations for new drug development.	15.6	Critical Shortage and Urgency	

24		Biological Sample Storage Operator	—	Use biobanking-related instruments and equipment to perform extraction, storage, classification, security, and quality control of biological samples.	11.8	Moderate Shortage and Urgency	
25		Cellular Immunotherapy Product Engineer	—	Use specialized equipment to develop and produce various types of cell-based immunotherapies targeting solid tumors.	12.4	Severe Shortage and Urgency	
26	Integrated Circuit	Semiconductor Auxiliary Material Preparation Worker	6-17-08-01	Operate silicon core preparation equipment and vacuum calcination equipment to prepare silicon cores and high-purity components within furnaces.	12	Critical Shortage and Urgency	Daxing District, Haidian District, Economic-Technological Development Area, Changping District, Xicheng District, Chaoyang District, etc.
27		Assembly and Calibration Technician of Equipment for Electronic Products	6-21-04-01	Use equipment, instruments, and tools such as vacuum coating machines and bonding machines to assemble and debug special process equipment and testing equipment for electronic products.	12.3	Critical Shortage and Urgency	
28		Vacuum Testing Technician	6-21-04-02	Use instruments, equipment, and tools such as molecular pumps and vacuum gauges to conduct vacuum testing on vacuum acquisition equipment and vacuum electronic devices.	11.5	Moderate Shortage and Urgency	
29		Optical Fiber and Cable Manufacturing Technician	6-24-03-02	Operate special equipment for optical fiber and cable manufacturing to produce preforms, optical fibers, cables, and optical devices.	10.2	Severe Shortage and Urgency	
30		Electronics Layout Design Technician	6-25-01-12	Operate computer-aided design systems and photolithography equipment to produce original drawings, master plates, and working plates for printed circuits, integrated circuits, and shadow masks.	10.6	Critical Shortage and Urgency	
31		Printed Circuit Board Manufacturing Technician	6-25-01-13	Operate screen printing, electroplating, and mechanical equipment to process and produce printed circuit boards.	10.4	Critical Shortage and Urgency	
32		Wafer Processing Technician	6-25-02-04	Operate crystal growth equipment to prepare and grow crystal ingots, and process them into wafers.	10.1	Critical Shortage and Urgency	
33		Semiconductor Chip Manufacturing Technician	6-25-02-05	Operate equipment such as epitaxial furnaces, high-temperature oxidation diffusion furnaces, lithography machines, and deposition platforms to manufacture semiconductor discrete devices, integrated circuits, and sensor chips.	12.5	Moderate Shortage and Urgency	
34		Semiconductor Discrete Device and Integrated Circuit Assembly and Calibration Technician	6-25-02-06	Operate ball placement, dicing, welding, and bonding equipment to assemble and debug semiconductor discrete devices and integrated circuits.	10.6	Moderate Shortage and Urgency	
35		Product Reliability Testing Technician	—	Use instruments and meters to test and inspect products, components, etc., for metrics such as Mean Time Between Failures (MTBF) and reliability performance.	14.6	Severe Shortage and Urgency	
36		Optical Instrument Inspector	—	Use measuring tools and instruments to inspect and test the functions and performance of optical instruments.	11.2	Moderate Shortage and Urgency	
37		Compound Semiconductor Material Production Technician	—	Purify and produce compound semiconductor materials such as Gallium Arsenide (GaAs), Indium Phosphide (InP), Gallium Nitride (GaN), and Silicon Carbide (SiC).	9.6	Severe Shortage and Urgency	
38		Semiconductor Device and Integrated Circuit Testing Technician	—	Test the quality and functionality of semiconductor devices and integrated circuit products.	16.7	Critical Shortage and Urgency	

39		Semiconductor Special Processing Manufacturing Technician	—	Manufacture semiconductor specialty gases and specialty chemicals.	12	Moderate Shortage and Urgency	
40	Intelligent Connected Vehicle	Intelligent Connected Vehicle (ICV) Test Engineer (S)	4-04-05-15	Use tools, measuring tools, testing instruments, and equipment to conduct functional verification and testing of ICVs and their related components.	13.8	Severe Shortage and Urgency	Daxing District, Haidian District, Shunyi District, Tongzhou District, Fengtai District, Economic-Technological Development Area, etc.
41		New Energy Vehicle Charging Station Installation, Maintenance and Repair Technician	6-29-03-08	Use special tools to install, commission, and maintain charging stations for new energy vehicles.	10.5	Moderate Shortage and Urgency	
42		ICV Assembly, Commissioning, Operation and Maintenance Engineer (S)	6-31-07-05	Use special equipment, tools, and instruments to assemble, commission, detect, jointly debug, monitor the status, and perform operation and maintenance of ICVs and roadside equipment.	16.9	Severe Shortage and Urgency	
43		New Energy Vehicle Power Battery Test Technician	—	Test the safety and performance of new energy vehicle power batteries, and conduct organization and analysis on the battery data.	18.5	Critical Shortage and Urgency	
44		New Energy Vehicle Power Battery System Inspection and Repair Technician	—	Detect and maintain new energy vehicle power battery systems and their core components.	15.5	Moderate Shortage and Urgency	
45		New Energy Vehicle High-voltage Component Inspection and Repair Technician	—	Detect and maintain high-voltage components in new energy vehicles.	10.9	Severe Shortage and Urgency	
46	Intelligent Manufacturing and Equipment	Power Aggregation Operator (L/S)	4-11-01-07	Use virtual power plant software and hardware systems and special tools to expand virtual power plant business, tap user resources, monitor the operation status of aggregated power systems, and conduct power transactions.	15.4	Critical Shortage and Urgency	Haidian District, Changping District, Chaoyang District, Xicheng District, Daxing District, Economic-Technological Development Area, etc.
47		Multi-Process CNC Machine Tool Operator & Adjuster	6-18-01-07	Operate CNC machining production lines, CNC combined machine tools, compound machine tools, and machining centers to conduct workpiece cutting processing.	11.4	Severe Shortage and Urgency	
48		Additive Manufacturing Equipment Operator (L/S)	6-18-01-13	Responsible for the installation, commissioning, maintenance, and repair of additive manufacturing equipment, and conduct production operations.	14.7	Severe Shortage and Urgency	
49		Metal Heat Treatment Technician	6-18-02-03	Operate heat treatment equipment to conduct heat treatment processing such as annealing, normalizing, quenching and tempering, surface quenching, tempering, carburizing, and nitriding on metal materials, blanks, or workpieces.	10.3	Moderate Shortage and Urgency	
50		Machine Tool Assembly, Commissioning & Maintenance Technician	6-20-03-01	Use equipment, tooling, tools, and testing instruments to assemble, commission, and maintain machine tools.	10.7	Severe Shortage and Urgency	
51		UAV (Drone) Assembly, Commissioning & Maintenance Technician	6-23-03-15	Use equipment, tooling, tools, and debugging software to select accessories, assemble, commission, inspect, and maintain UAVs.	13.5	Moderate Shortage and Urgency	
52		Laser Equipment Installation & Commissioning Technician	6-25-04-04	Use equipment, tools, and instruments to install, commission, maintain, and repair industrial laser equipment and civil laser product components and complete machines.	13.8	Moderate Shortage and Urgency	

53		Smart Hardware Assembly & Commissioning Technician	6-25-04-05	Use tools and equipment such as oscilloscopes, signal generators, computers, or mobile phones to conduct assembly and commissioning work of intelligent hardware and system hardware.	13.7	Severe Shortage and Urgency	
54	Intelligent Manufacturing and Equipment	Electronic Equipment Mechanical Assembly & Calibration Technician	6-25-04-06	Use tools, equipment, and instruments such as assembly workbenches, levels, theodolites, and dial indicators to assemble and adjust mechanical parts and complete mechanical components of electronic equipment.	11.8	Severe Shortage and Urgency	Haidian District, Changping District, Chaoyang District, Xicheng District, Daxing District, Economic-Technological Development Area, etc.
55		Electrical Equipment Installation Technician	6-29-03-02	Use tools and testing instruments to install, commission electrical equipment, devices, instruments, and circuits.	10.1	Moderate Shortage and Urgency	
56		Industrial Robot System Operation & Maintenance Engineer (S)	6-31-07-01	Use tools, measuring tools, testing instruments, and equipment to conduct data collection, status monitoring, and operation and maintenance of industrial robots, industrial robot workstations, or systems.	12.3	Critical Shortage and Urgency	
57		Industrial Vision System Operation & Maintenance Engineer (S)	6-31-07-02	Responsible for the selection, installation and commissioning, programming, fault diagnosis and elimination, daily maintenance and repair of the vision system of intelligent equipment.	19.2	Critical Shortage and Urgency	
58		Industrial Robot System Operator (S)	6-31-07-03	Use human-computer interaction equipment and tools such as teaching pendants and operation panels to conduct assembly, programming, commissioning, process parameter modification, and other operations on industrial robots, industrial robot workstations, or systems.	10.7	Critical Shortage and Urgency	
59		Smart Manufacturing System Operation & Maintenance Engineer (S)	6-31-07-04	Engage in data collection, status monitoring, fault analysis and diagnosis, preventive maintenance, repair work, and optimized production of intelligent manufacturing systems.	9.9	Moderate Shortage and Urgency	
60		Industrial Robot Operation & Maintenance Technician	—	Conduct functional inspection and maintenance of core components of industrial robots, industrial robot workstations, or systems.	10.8	Moderate Shortage and Urgency	
61		Specialized CNC Machine Tool Control & Adjustment Technician	—	Operate a single professional CNC machine tool to conduct workpiece cutting processing.	13.1	Severe Shortage and Urgency	
62	Green Energy, Energy Conservation, and Environmental Protection	Energy Storage Power Station O&M Manager (L)	4-11-01-04	Use tools, measuring tools, testing instruments, and equipment to conduct data collection, status monitoring, operation and maintenance, and equipment data management of electrochemical, compressed air, flywheel and other energy storage units or systems.	11.7	Critical Shortage and Urgency	Dongcheng District, Chaoyang District, Haidian District, Changping District, Fengtai District, etc.
63		HDR-I Technician (L)	6-17-01-08	Operate equipment such as reaction shaft furnaces, heaters, process loop systems, carbon dioxide removal systems, charging and discharging systems, coating systems, and silo systems to produce hydrogen-based direct reduced iron that meets quality standards.	9.5	Critical Shortage and Urgency	
64	Business Services	E-Commerce Specialist (S)	4-01-06-01	Engage in business activities on the Internet and modern information technology platforms.	14.2	Severe Shortage and Urgency	Chaoyang District, Haidian District, Changping District, Dongcheng District, Tongzhou District, etc.
65		Internet Marketing Specialist (S)	4-01-06-02	Promote and market enterprise products on digital information platforms by using the interactivity and communication credibility of the Internet.	12.4	Severe Shortage and Urgency	
66		Cross-Border E-Commerce Operation and Management Specialist (S)	4-01-06-03	Engage in international trade activities, and conduct international commodity or service transactions, promotion, operation, and supply chain management, relying on Internet platforms and digital tools.	15.3	Severe Shortage and Urgency	

67		UAV Swarm Flight Planner	4-02-04-07	Engage in UAV swarm flight route planning, flight plan and flight task formulation, and flight on-site management.	17.6	Severe Shortage and Urgency	
68	Life Services	Food Safety Manager	4-03-02-11	Engage in food safety control on raw materials, food and related products, and personnel in the production and operation activities of food production, catering services, food sales and other entities.	13.2	Severe Shortage and Urgency	Chaoyang District, Xicheng District, Fengtai District, Daxing District, Haidian District, etc.
69		Elderly Caretaker	4-10-01-05	Engage in elderly life care and nursing services.	10.1	Critical Shortage and Urgency	
70		Domestic Service Attendant	4-10-01-06	Engage in housework, family member care, family affairs management, etc.	11.6	Critical Shortage and Urgency	
71		Healthcare Attendant	4-14-01-03	Use basic medical nursing knowledge and skills to engage in health care and life care services for care recipients in homes, hospitals, communities, and long-term care service institutions.	14	Moderate Shortage and Urgency	
72		Coffee Processing Technician	6-02-06-13	Operate equipment to process coffee cherries into green coffee beans, roasted coffee beans, and other coffee products or by-products.	11.9	Critical Shortage and Urgency	
73		Medical Escort	—	Engage in work such as accompanying medical treatment, interpreting medical advice, recording medical records, reminding medication precautions, providing psychological comfort, and assisting in handling hospitalization procedures.	13.5	Moderate Shortage and Urgency	

Note: I. Occupations (job types) without occupational codes have not yet been included in the *Occupational Classification of the People's Republic of China (2022 Edition)* and the occupations (job types) published by the Ministry of Human Resources and Social Security, the State Administration for Market Regulation, and the National Bureau of Statistics.
II. Occupations (job types) can be tagged as green (L), digital (S), or both (L/S).

III. Catalog of Technical and Skilled Talent Professional Evaluation Guidelines

S/N	Industry	Basic Description	Eligible Majors for Professional Title Application		Eligible Major for Skill Certification Application	
			Professional Title Series	Evaluation Specialty	Occupation (Job Type)	Occupation Code
1	New Generation Information Technology	1. Research, design, manufacturing, utilization, and maintenance related to information and communication engineering. 2. Engage in information and communication network operations, including configuration management, performance management, optimization management, and troubleshooting.	Engineering Technology	Communications	Information and Communication Network Operation Administrator (S)	4-04-04-01
2		1. Engage in research, planning, design, implementation, and assessment of information system security. 2. Perform network and information security management, protection, and monitoring.	Engineering Technology	Cyberspace Security	Network and Information Security Administrator (S)	4-04-04-02
3		1. Engage in research, planning, design, implementation, and assessment of information system security. 2. Conduct network and information security penetration testing, compliance testing, and personal information protection compliance management.	Engineering Technology		Information Security Tester	4-04-04-04
4	Artificial Intelligence (AI)	1. Engage in the analysis, research, development, design, optimization, operation, maintenance, management, and application of artificial intelligence systems related to AI algorithms and deep learning technologies. 2. Utilize AI training software to conduct database management, algorithm parameter configuration, human-computer interaction design, and performance testing & tracking for AI products.	Engineering Technology	Artificial Intelligence	Artificial Intelligence Trainer (S)	4-04-05-05
5	Robotics	1. Engage in the research and design of robot structures, control and perception technologies, as well as integrated robot systems and products. 2. Utilize human-machine interaction devices and tools such as teaching pendants and operation panels to perform assembly, programming, debugging, and process parameter modification for industrial robots, industrial robot workstations or systems. 3. Use tools, measuring instruments, testing equipment and devices to conduct data collection, condition monitoring, and operation and maintenance for industrial robots, industrial robot workstations or systems.	Engineering Technology	Robotics	Industrial Robot System Operator (S)	6-31-07-03
6					Industrial Robot System Operation & Maintenance Engineer (S)	6-31-07-01

7	Integrated Circuits (IC)	1. Engage in design, process development, packaging, testing of integrated circuit, and electronic design automation (EDA) tool development. 2. Operate equipment for ball mounting, dicing, welding, and bonding to perform assembly and debugging of discrete semiconductor devices and integrated circuits. 3. Operate equipment such as epitaxial furnaces, high-temperature oxidation and diffusion furnaces, lithography machines, and deposition platforms to manufacture discrete semiconductor devices, integrated circuits, and sensor chips.	Engineering Technology	Integrated Circuits	Semiconductor Discrete Device and Integrated Circuit Assembly and Calibration Technician	6-25-02-06
8					Semiconductor Chip Manufacturing Technician	6-25-02-05
9	Low-Altitude Technology	1. Engage in the R&D and manufacturing of low-altitude aircraft, the construction of low-altitude operation systems, and low-altitude safety assurance. 2. Operate unmanned aerial vehicles (UAVs) via remote control devices to complete scheduled flight tasks. 3. Use equipment, tooling, tools and debugging software to perform component selection, assembly, debugging, inspection, repair and maintenance of UAVs.	Engineering Technology	Low-altitude Technology	UAV Pilot	4-02-04-06
10					UAV (Drone) Assembly, Commissioning & Maintenance Technician	6-23-03-15
11	Automotive Industry	1. Engage in the R&D and design of automotive products, processes, and automotive business, and provide guidance for the production and remanufacturing of automotive products. 2. Use tools, measuring instruments, testing instruments and equipment to conduct functional verification and testing of intelligent connected vehicles and their related components. 3. Engage in the production and processing of auto parts and decorative parts, as well as the manufacturing, maintenance, repair and debugging of complete automobiles. 4. Engage in the assembly and debugging of complete automobiles and component combinations, as well as the recycling and dismantling of automobiles. 5. Engage in the maintenance, repair and debugging of automobiles and special vehicles.	Engineering Technology	Automotive Industry	Automotive Production Line Operator	6-22-01-01
12					Automotive Assembly & Commissioning Technician	6-22-02-01
13					Automotive Repair Technician	4-12-01-01

14	Intelligent Manufacturing and Equipment	1. Engage in demand planning and maintenance plan formulation of equipment spare parts, equipment management and control, as well as guidance on equipment use and repair. 2. Use machines, tools and testing instruments to perform installation and debugging of electrical equipment and devices.	Engineering Technology	Public Equipment Installation	Electrical Equipment Installation Technician	6-29-03-02
15		1. Engage in road traffic policy research, planning and design, management and control, safety assessment, and other related work. 2. Use tools and equipment to conduct the construction of rail transit communication projects and the maintenance of equipment and facilities.	Engineering Technology	Transportation	Rail Transit Communications Technician	6-29-03-09
16	Scientific and Technological Services	1. In the process of the transfer, transformation and industrialization of scientific and technological achievements, engage in work such as achievement excavation, cultivation, incubation, maturation, evaluation, promotion, transaction, and provision of related services in finance, law, and intellectual property rights. 2. Engage in technological and economic activities such as scientific and technological innovation, entrepreneurship, and achievement transfer and transformation, and provide consulting services including independent analysis results and solutions.	Engineering Technology	Technology Brokerage	Sci-Tech Consultant	4-07-02-02
17	Green Energy, Energy Conservation, and Environmental Protection	1. Engage in the monitoring and detection of environmental changes, and the evaluation of their impacts on human health and ecosystems. 2. Apply energy-saving and emission-reduction technologies to engage in the evaluation, adjustment, transformation, operation and maintenance of buildings, their surrounding environments, and auxiliary equipment.	Engineering Technology	Environmental Protection	Building Energy Efficiency & Emission Reduction Consultant	4-09-07-06
18		1. Engage in the research, development, and design of strategies, plans, paths and technologies for the reduction and negative emission management of greenhouse gases such as carbon dioxide, and evaluate the implementation effects. 2. Engage in the monitoring, statistical accounting, verification, transaction and consulting of greenhouse gas emissions such as carbon dioxide.			Carbon Emission Administrator	4-09-07-04
19	Pharmaceutical and Health	1. Engage in the design of pharmaceutical production processes, product inspection, and technical guidance for pharmaceutical products. 2. Engage in the processing, inspection, verification, testing and analysis of finished	Engineering Technology	Chemical Pharmaceuticals	Pharmaceutical Inspector	4-08-05-04

20		pharmaceutical products (such as APIs and preparations), intermediate products, raw materials and excipients, and packaging materials. 3. Use preparation equipment and utensils to process raw materials and excipients into pharmaceuticals.			Pharmaceutical Preparation Worker	6-12-03-00
21	Cultural and Creative Industries	1. Engage in the design and production of traditional arts and crafts, as well as modern practical craft products. 2. Use special tools to cut and process raw materials such as jade, stone, ivory, shell, bone, horn, fruit stone, wood and bamboo, and carve or sculpt them into crafts. 3. Use special equipment and manual work to make cloisonné crafts from metal materials, enamel glazes, etc.	Industrial Arts	Special Arts	Artware Carver	6-09-03-01
22					Cloisonné Artisan	6-09-03-04
23		1. Engage in the research, planning and design of exhibitions and displays. 2. Engage in the visual design of space environment for conferences, exhibitions and festival events.	Industrial Arts	Exhibition Design	Exhibition & Convention Designer	4-08-08-21
24	Cultural Relics and Museology	1. Engage in archaeology, cultural relics protection, preservation, display and research. 2. Engage in the investigation of the current status of cultural relics, the judgment of their intrinsic value, the analysis of their preservation status, and the maintenance and restoration of cultural relics such as reinforcement, cleaning, bonding, replenishment and color coordination.	Cultural Relics and Museology	Cultural Relics and Museology	Cultural Relic Restorer	4-13-03-02