**Introduction to the Department of Automation**

The department of automation was founded early in 1958, which was supported by the discipline of Control Science and Engineering. During the continuous development and improvement, the discipline of Control Science and Engineering has been selected as a key discipline of “211 Engineering” to be developed, also the key discipline of Beijing City. Automation is the National and Beijing’s special major, which was evaluated as B+ in the 2017 National University Subject Assessment. As the first members of Ministry of Education's Excellent Engineer Education and Training Program, the major of automation has founded the Excellence Engineer Class of Automation, and completed the engineering and education certification of the Automation major in June 2018.

The major of Automation has been playing a key role in BUCT, inheriting the characteristics of multidisciplinary, knowledgeable and extensive. Currently, with the gradual deepening of professional construction, three distinctive professional directions have been formed: Control Theory and Application, Chemical Control Engineering, Artificial Intelligence and Robotics. As an important part of modern industrial production, the major of Automation plays a key role in intelligent production, especially in the process industry in the “Made in China 2025” plan. The Automation in BUCT maintains strong competitiveness in traditional process industries such as Petroleum, Chemical, Light Industry and other process industries, which obtained a good reputation and recognition of teaching and scientific achievements and have a strong comprehensive strength and distinctive characteristics.

**Professional Foundation Course in Automation:**

Principles of Electric Circuits, Digital Electronic Technique, Practice of Electronic Technique(I), Practice of Electronic Technique (II), Analog Electronic Technique, Introduction of Automation, Unit Operations of Chemical Engineering, Automation Control Theory(I), Automation Control Theory (II), Automation Device, Theory and Interface Technology of Microcomputer, Measurement Technology and Sensor, Process Control Engineering and so on.

**Professional Direction Courses:**

In the Direction of Control Theory and Application:

System Identification, Optimal Control Theory, Advanced Process Control Techniques and Industrial Applications, Computer Aided Control Systems Design and so on.

In the Direction of Chemical Control Engineering:

System Modeling and Simulation, Process Design Control and Optimization, Computer-Controlled Systems, Advanced Process Control Techniques and Industrial Applications and so on.

In the Direction of Artificial Intelligence and Robotics:

Artificial Intelligence and Application, Digital Image Processing, Pattern Recognition and Machine Learning, Introduction of Robotics and so on.

**Featured Courses:**

Beijing-Level Quality Course: Process Control Engineering, Automation Device, Practice of Process System and Control Engineering Simulation.

School-Level Quality Course: Automation Control Theory (I, II), Control Engineering Design.

Bilingual Course: Process Control Engineering, Automation Control Theory, Computer-Controlled Systems, Theory and Interface Technology of Microcomputer.

**Professional Practice:**

Computer Aided Control Systems Design, Internship of Chemical Process and Control Simulation, Practice of Robot Simulation and Application, Electrical Engineering Comprehensive Practice, Control Engineering Comprehensive Practice, Cognition Practice, Project Practice, Control Engineering Design, Practice of Application Software, Engineering Training (Excellence Engineer Class) and so on.

**The ways to improve the students’ course knowledge and comprehensive quality:**

* Classroom Courses, On-campus Experiments and Practical Courses;
* Tutor System: under the guidance of the instructor, the students conduct research training, subject competitions, and exempt students to participate in research activities in advance;
* Multi-Level Engineering Practice Activities, including: Case Teaching, Corporate Visits, Professional Exhibitions, Subject Competitions, Internships, Training, and other multi-level and progressive forms of practice);
* CO-OP Mode Enterprise Practice (paid internship);
* Continuity of Practice Parts (enterprise internship->enterprise training->graduate design)

**Computer Science and Technology**

Computer Science and Technology is one of the undergraduate majors under the Department of Computer, College of Information Science and Technology, Beijing University of Chemical Technology. Since 1986, undergraduate students have been enrolled, from the initial annual enrollment of 30 students to the current year of 200 students, and the number and quality of teachers continue to grow and improve at the same time. Computer science and technology is a traditional dominant subject and major in BUCT, who has advantages and characteristics in the petrochemical industry, information application system construction, process industry data mining, software testing and software reliability, information security and information services, visual computer and network computing, etc. With the guiding ideology of “foundation-strengthened, ability-highlighted, quality-focused, and innovation-oriented”, with the support of the high-level faculty with the background of overseas study, and with the platform of information science, it has formed a distinctive and flexible training mode.

Professional basic courses and professional directions courses include:

Discrete mathematics, programming basis, assembly language programming, data structure, circuit and electronic technology, digital logic, operating system principles, computer composition principles, database principles, computer networks, compilation principles, software engineering.

Featured courses include:

Data warehousing and data mining, introduction to artificial intelligence, digital media technology, computer graphics, software testing technology, algorithm design and analysis

Professional practices include:

Program design training, data structure experiment, operating system course design, computer composition principle experiment, compilation principle course design, database principle course design, metalworking practice, electrical and electronic internship, cognitive internship, production internship, computer system integrated design, graduation design ( thesis)

Ways to improve course learning and comprehensive quality skills include:

General education courses, tutor system, military training, social practice, college students’ innovation and entrepreneurship, application software practice, graduation design, college students’ science and technology innovation plan, various information science competitions, etc.

Data Science and Big Data Technology

The rapid development of information technology has inspired the birth of new technologies such as the Internet of Things and artificial intelligence. All of these technologies are inseparable from the technical support of data science and big data.

The aim of this major is to cultivates talents who have a solid knowledge foundation, strong practical ability, and adapts to the requirements of the era of big data, as well as moral, intellectual, physical and aesthetic development. They will have good scientific and information technology literacy, with the ability of combining the theory and method of data science with big data technology. By the training of this major, the students will independently track the development trend and frontier of technology, apply the latest big data processing technology to research and development of big data storage, analysis and display, to solve complex engineering problems related to big data technology in various fields.

The basic professional courses for this major include:

Introduction to Computer Science, Discrete Mathematics, Program Development Foundation, Data Structure, Circuit and Electronic Technology, Digital Logic, Fundamentals of Operating System, Fundamentals of Database, Fundamentals of Big Data Technology, Non-relational Database.

The professional courses for this major include:

Design and Analysis of Algorithm, Computer Architecture, Computer Network, Data Warehouse and Data Mining, Introduction to Artificial Intelligence, Introduction to Machine Learning, Virtualization and Cloud Computing Technology, Parallel and Distributed Computing.

Distinctive Courses include:

Mobile Internet Technology, Frontier of Parallel Computing Technology, Programming for Multi-core CPUs, Python Programming.

Professional Practices include:

Experiments for Data Structure, Course Exercise for Fundamentals of Database, Experiments for Fundamentals of Big Data Technology, Non-relational Database Experiment, Integrated Design of Computer Systems. Electrical and Electronic Practice, Understanding Practice, Production Practice, Graduation Project (Thesis).

Ways to course learning and improving comprehensive quality skills include:

General Education Courses, Tutorial System, Military Training, Social Practice, Quality Expansion and Innovation, Application Software Practice, Graduation Project, Science and Technology Innovation Plan for College Students, various competitions, etc.

Measurement and Control Technology and Instrument Major

Measurement and Control Technology and Instrument are the source of information subject, which involves detection and control technology, computer technology, signal processing technology, communications and network technology and related technology. Measurement and Control Technology and Instrument are very practical disciplines, such as industrial automation, production process automation, detection technology and instrument, electronic instruments and measurement technology, intelligent instruments, computer process control , etc.

This major cultivates research and inter-disciplinary talents with basic knowledge and application ability in instrument design, manufacture, measurement, control and computer science, and can be engaged in measurement and control technology, instrument design and manufacturing, computer application technology in various sectors of the national economy senior engineering technical talents.

The development trend of measurement and control technology and instrument specialty in the future: 1.Miniaturization. With the continuous development and maturity of micro-electromechanical technology, its application field will also increase constantly, so miniaturization is one of the future development trends of instrumentation. Microinstruments will not only have the functions of traditional instruments, but also play a unique role in the fields of automation technology, aerospace, military, biotechnology and medical treatment. 2. Multi-functionalization. Multi-functional integrated products not only improve performance, but also provide better solutions for various test functions. 3. Intelligent. In the future, the development of instruments and meters will contain certain artificial intelligence, which can solve a kind of problems difficult to be solved by traditional methods after being applied in modern instruments and instruments. 4. Networking. With the rapid development of network technology, Internet technology is gradually penetrating into the field of industrial control and intelligent instrument and meter system design, and the future measurement and control instrument and meter industry will be networked. The concept of networked instrumentation is a breakthrough in the concept of traditional measuring instruments.

**The professional basic courses and professional specialized courses of Measurement and Control Technology and Instrument major include:**

Circuit foundation, analog electronic technology, digital electronic technology, sensor principle, computer principle and technology, automatic control principle, detection technology and instrumentation, error theory, embedded system, measurement and control system design.

**Featured courses include:**

Measurement and control technology and instrument, measurement and control software technology, process fault diagnosis technology, biochemical sensing technology, measurement and control system design.

**Professional practice include:**

Electrical and electronic practice, electronic technology experiment, measurement and control system course design, process testing instruments and monitoring system practice course experiment, understanding practice, production practice, graduation design, campus and off-campus practice base.

**Ways to learn courses and improve comprehensive quality and ability include:**

General education courses education, experimental teaching, experimental skills training, course design, graduation design, course practice and campus practice base experiment; Through the tutorial system, students carry out scientific research training under the guidance of tutors, participate in university students' scientific and technological innovation plan and academic competitions, and the students recommended for graduate study enter the research room in advance to participate in teachers' research activities; In addition, Students' comprehensive quality and ability can also be improved through military training, social practice, case teaching of enterprise tutors, off-campus enterprise visits and off-campus production and practice bases.

**Electronic Information Engineering**

Electronic information engineering, as the main specialty in the field of information technology, occupies a very important position in the national economy and is also the fastest-growing industry. It mainly studies the theory, technology and engineering implementation of information acquisition, information transmission, information processing and information application, including Information perception and acquisition, information expression and measurement, information storage and transmission, information identification and separation, information human-machine interface, etc. The demand for talent in this industry will be greater both in quantity and quality and the industry will be more integrated with other professional fields.

The major of electronic information engineering will foster students’ all-round development. You will master the basic theory and professional knowledge of electronic information engineering, such as circuit and electronics, signal system and control, electromagnetic field and electromagnetic wave, communication technology, computer technology, etc. As an electrical information engineering student, you’ll have the ability to apply basic professional knowledge and basic theory to analyze and solve various problems in the actual complex electronic information system. You will be an internationally competitive undergraduate in electronic information or related fields,and have a solid mathematical and physical foundation, innovative spirit, solid professional knowledge and practical ability.

The basic courses in electronic information engineering include:

Principles of Electrical Circuits, Fundamentals of Analog Electronics,

Digital Circuit and Logic Design, Signals and Systems, Digital Signal Processing, Fundamentals of Information Theory, Communication Theory,

Fieldand Wave Electromagnetics, Random Signals Analysis,

Microcomputer Principles and Interface Technology.

Major courses include:

 Image processing and intelligent recognition: Digital Image Processing,

Principles and Applications of DSP, Information Theory and Coding, Artificicial Intelligence and Patten Recognition.

Integrated circuit design direction: Communication Electronic Circuits, Principle and Application of Electronics Design Automation, Embedded System Design, VLSI Design.

Biomedical electronics direction: Biomedical Signal Processing, Biomedical Instrumentation Design, Multi-sensor Information Fusion.

Featured courses include:

Field-grade quality courses: Signals and Systems.

Seminar: Random Signals Analysis, Digital Image Processing.

Professional practices include:

 Programming training, Basic Applied Software, Practicum in Applied Software, Cognition Practice and Productive Practice(Internal and external practice base), Electric and Electronic Practice, Project of Electronics & Information Technology, Signal Analysis and Process, Digital Sytem Design, Graduation and other practical links; Various links serve to develop students' computer programming ability, signal analysis and processing capabilities, hardware design capabilities, and communication system

capabilities.

Ways to improve course learning and comprehensive quality skills include:

 General Education courses, Tutorial System, Military Education, Social Practice, The Development and Innovation, Graduation Thesis, College Student’s scientific innovation program.

**Communication Engineering**

The theoretical foundations of communication engineering and electronic information engineering, electronic information science and technology are basically the same. Electronic information engineering focuses on the theoretical, technical and engineering aspects of information systems, while communication engineering focuses on the theoretical, technical and engineering aspects of communication systems and networks. Communication engineering will further rely on network technology and microelectronic devices, and constantly update the application technology in the fields of high-speed wireless communication, Internet of Things, multi-network convergence, and so on. It will combine more closely with the application of image, video, electronic payment, and presents the development trend of wireless, broadband, multimedia.

The major of communication engineering will foster students’ all-round development. You will master the basic theory and professional knowledge of circuits and electronics, signal systems and controls, fields and waves, modern communications (including wired and wireless), the Internet of Things and communications, computer technology, etc. As an communication engineering student, you’ll have the ability to apply basic professional knowledge and basic theory to analyze and solve various problems in the actual complex communication system. You will be an internationally competitive undergraduate in communication or related fields,and have a solid mathematical and physical foundation, innovative spirit, solid professional knowledge and practical ability.

The basic courses of the Communication Engineering major include:

Principles of Electrical Circuits, Fundamentals of Analog Electronics,

Digital Circuit and Logic Design, Signals and Systems, Digital Signal Processing, Fundamentals of Information Theory, Communication Theory,

Fieldand Wave Electromagnetics, Random Signals Analysis,

Microcomputer Principles and Interface Technology.

Major courses include:

Internet of Things communication direction: Switching Principle for Modern Telecommunication, Modern Communication Technology, Energy Monitoring and Internet of Things Technology course.

Wireless communication direction: Mobile Communication, Microwave Technology, Communication with Radio waves, Coding and Information Security.

Signal and information processing direction: Digital Image Processing,

Principles and Applications of DSP, Multi-sensor Information Fusion.

Featured courses include:

Field-grade quality courses: Signals and Systems.

Seminar: Random Signals Analysis, Digital Image Processing.

Professional practices include:

 Programming training, Basic Applied Software, Practicum in Applied Software, Cognition Practice and Productive Practice(Internal and external practice base), Electric and Electronic Practice, Project of Electronics & Information Technology, Signal Analysis and Process, Digital Sytem Design, Graduation and other practical links; Various links serve to develop students' computer programming ability, signal analysis and processing capabilities, hardware design capabilities, and communication system

capabilities.

Ways to improve course learning and comprehensive quality skills include:

 General Education courses, Tutorial System, Military Education, Social Practice, The Development and Innovation, Graduation Thesis, College Student’s scientific innovation program.

 **Digital Media Art**

The major of Digital Media Art belongs to the computer department of the College of Information Science and Technology, Beijing University of Chemical Technology. This major has a strong faculty, more than 80% of the faculties have got doctoral degrees. The research fields of digital media art include three-dimensional animation, interactive cartoons, animations for children games for children, medical + game, intelligence Media and product packaging & publicity ，which have distinctive characteristics and popularity in art design industry.

In the aspect of personnel training, we not only emphasize on students' solid basic theoretical knowledge, but also pays attention to their abilities of scientific research, engineering practice and innovative ability. In 2015, Digital Media Art major begin to enroll students, after three years of undergraduate training，we have made many fruitful results. At present, One people have been granted the postgraduate qualification , and will be majoring in computer science.

professional basic courses of this major include: Introduction to Digital Media Art, Audiovisual Language, Introduction to Game Design, Introduction to Animation, animation movement axiom, Conceptual Design, Digital Hand-Painting, Training of Design Thinking, Interactive Design, Story Creation-Visual Narration and Expression.

**Professional courses include:** 3D game art, virtual reality technology, layout design, web design, digital audio design, digital video editing art, digital video effects.

**Featured courses include:** dynamic graphics design, advanced game design, mobile Internet applications, game psychology, independent game topics, information visualization design.

**Professional practices courses include:** creative animation design, sub-lens script design, interface design, three-dimensional animation design, three-dimensional website development and Application.

**Ways to improve student’ curriculum learning skill and comprehensive quality include:**

1. Students’ learning and teachers' scientific research are deeply integrated to develop campus student exhibition website.

we aims at cultivating students’ good scientific literacy and artistic accomplishment, who know both technology and art, can use new computer media design tools for art creation. Enabling students to learn the basic theory, knowledge and skills of computer science and technology, to familiar with the basic algorithms of graphics and image processing, be proficient in the use of various digital media software, mastering all kinds of digital media design, development, production, transmission and processing of professional knowledge and skills, with good artistic accomplishment and Solid programming skills. After graduation, students can be engaged in graphic design, network media production, game and animation production, digital film design and virtual reality application & research.

2. encourage students to create independently, participate in discipline competitions actively.

In order to encourage students to create independently and improve their professional and technical level，we organize students to participate in various competitions. In May 2018, we held the first Golden Bell Cup Creative Design Competition. More than 60 students participated actively in the competition, collecting more than 30 high-quality art works, including game design, animation design, graphic design. In addition, more than 10 students participated in other competitions, including the 13th China (Beijing) International Student Animation Festival "Poplar Award" competition, the 2018 CUGA China University Game Art Design Competition, the 2018 Beijing University Student Digital Media Design Competition, the 2018 China Good Creativity and China Digital Creativity Competition. Competitions and so on.

3, explore the school& enterprise collaborative education mechanism, and build a practical teaching system.

In order to show characteristics of our Digital Media Art major, establish a better training and teaching system, provide more diversified and systematic practice opportunities for digital creative talents, we actively promote the cooperation between schools and enterprises, and take the comprehensive deepening of school-enterprise cooperation as an important task of development. At present, we have already cooperated with Tencent IEG Mutual Entertainment Business Group, Perfect World Games, Perfect World Film and Television, Perfect World Education, Crystal Digital Technology Co., Ltd., Crystal Stone Education Group, Beijing Novotel Technology Co., Ltd., Edip (Beijing) Culture and Technology Co., Ltd., and China Communications (Beijing) Digital Division. More than 10 companies, such as Technology Co., Ltd., Yeli Interactive (Beijing) Cultural Technology Co., Ltd., Beijing Start Technology Co., Ltd., have reached close cooperation and further cooperation intentions.

4. give full play to geopolitical advantages and achieve inter school resource sharing.

In order to make up for the shortage of Digital Media Art development in our university, teachers actively give full play to the geographical advantages of Beijing Chemical Industry, establish close cooperation with other professional development institutions to achieve new ideas of teaching and share scientific research resources. At present, close cooperation channels have been established with China Media University, Beijing Normal University, Beijing Forestry University, Beijing Printing College and other universities to make it easier for students to have access to cutting-edge and top learning resources.

5. promote inter school communication and international exchanges actively.

Teachers of Digital Media Art actively participate in the construction of international exchange activities of Beijing University of Chemical Technology, and is actively promoting the joint professional training program of Loughborough University, UK, aiming to provide students with more opportunities for international exchange. In addition, we established close ties with the Department of Game, Northeastern University of the United States and the Department of Game, University of Aberdeen, United Kingdom as well.