Biological Engineering

The Biological Engineering is one of the key construction majors of the school's “211 Project”, “985 Advantage Discipline Innovation Platform” and “first-class disciplines”. It has been rated as the “special major” of the Ministry of Education and Beijing city, and has passed the engineering certification of the Ministry of Education. The professional construction relies on the first batch of national key disciplines of Chemical Engineering and Technology, the first-level discipline of Materials and the first-level discipline of Biological Engineering of Beijing University of Chemical Technology. The enrollment plans for Biological Engineering, Biotechnology and Biomedical Engineering are unified. According to the rule of “big class enrollment and diversion training”, students can choose one of the major in Biological Engineering, Biotechnology and Biomedical Engineering after entering the university, according to their own interests and wishes.

Compared with similar domestic majors, the Biological Engineering of BUCT has high reputations in the fields of biorefinery, biological resources, bioenergy, biocatalysis and transformation, biomedical materials and synthetic biology. We now possess the Doctoral qualifications for Biological Engineering. The professional training objectives and specifications have outstanding practical characteristics. This major integrates scientific research results into teaching processes, and implements the multi-disciplinary training mode such as Tutor System, Experimental Class, Excellence Engineer Program, and Joint-Supervision. The major has passed the engineering certification of the Ministry of Education in 2016.

This major is dedicated to cultivate students with the basic scientific principles, basic technologies, technological processes and engineering design of modern biology, biological engineering and related industrialization. Students are expected to have a high sense of social responsibility and professional ethics, strong engineering practices, communication skills, teamwork and self-learning abilities. Students will be able to work in the area of biochemical to develop new technologies, products, engineering design, and also engage in the related production operation and managements.

Expected achievements after 5 years of graduation:

(1) Being able to carry out related work independently in the fields of biochemical, biomanufacture, biomaterials, bioenergy and biomedicine, and show the individual capabilities;

(2) Being able to discover and solve the practice problems in biological engineering using the basic scientific principles and techniques of biology and biological engineering, and could actively grasp the needs of national and social development.

(3) Being able to self-learn and adapt to the development, continuously enrich the practical experiences, and possess good professional competitiveness.

Professional Foundation and Professional Directions include: Chemical Engineering, Biochemistry, Microbiology, Biotechnology, Biochemical Separation Engineering, Biochemical Reaction Engineering and Equipment, Bioengineering Environmental and Safety Technology, Cell Biology and Cell Engineering, Enzyme Engineering and Protein Engineering, Molecular Biology and Genetic Engineering, Introduction to Biochemical Process Design, Lectures on Engineering Practice, Information Retrieval and Technology Writing, Frontiers in Bioengineering, Introduction to Bioengineering, Bio-Industry and Entrepreneurship.

Featured courses include: Biotechnology, Biochemical Separation Engineering, Biochemical Reaction Engineering and Equipment, Bioengineering Environmental and Safety Technology.

Professional practice includes: Biochemical Experiments, Microbiology Experiments, Biochemical Process Experiments, Biochemical Process Design, Molecular Biology Experiments.

Methods to improve the course learning and comprehensive quality ability include: Tutor System, College Students' Innovation and Entrepreneurship Contest, Budding Cup, Selection of the Master, Engineering Practice.

Pharmaceutical Engineering

Pharmaceutical engineering specialty of Beijing University of Chemical Technology is an interdisciplinary subject based on pharmacy, biotechnology, chemistry and engineering.

The specialty cultivation emphasizes the basic advantages in the fields of applied chemistry and bioengineering, and focuses on the research and development of new technologies and new processes in the field of pharmaceutical engineering. Integrate production and scientific research to cultivate composite pharmaceutical engineering talents.The discipline focuses on cultivating talent' analytical and innovative abilities, strengthening talent's practical ability, and cultivating pharmaceutical engineering professionals who are compound with industry, academia and research. And a education model of “basic research-technological innovation-engineering” has been established.

In 2011, pharmaceutical engineering specialty was selected as one of the first batch of excellent engineer training program of the ministry of Education. And this specialty successfully passed the adobe china education certification program in 2015.

[Basic specialized courses](http://dict.cn/basic%20specialized%20courses) and speciality direction courses including:

Biochemistry, Microbiology, Pharmaceutical Chemistry, Industrial Pharmacy, Pharmaceutical Engineering and Technology, Pharmaceutical Separation Engineering, Natural Medicinal Chemistry, Pharmaceutical Synthesis Reactions, Pharmaceutical Equipment and Workshop Process Design.

Featured courses including:

Biochemistry, Pharmaceutical Chemistry, Industrial Pharmacy, Pharmaceutical Engineering and Technology, Pharmaceutical Separation Engineering, Pharmaceutical Equipment and Workshop Process Design.

Professional practice including:

Microbiology experiments, biochemical experiments, pharmaceutical engineering professional experiments, etc.

The tracks to improve cultivation of eomprehensive qualities and ability including:Tutorial system, science and technology innovation contest , Germination Cup, MD-PhD Programme, various professional related experiments, etc.

Introduction of Biotechnology

Biotechnology is a basic discipline of biological science based on previous biochemical fields in our school. It was set up at the end of 2004 and approved to recruit undergraduate students at the beginning of 2005 by Ministry Department of Education, China. In 2005, students are enrolled under the category of bioengineering. All students of both bioengineering and biotechnology take the basic courses education together in the first semester at school. After one year, students have a chance to choose their favorite specialty among biotechnology, bioengineering and biomedical engineering according to their own interests and wishes.

Biotechnology, rated as key construction majors of Ministry Education and Beijing, has become a significant part of “Double-First-Level” specialty construction in our school. It belongs to science but focuses on applied basic research with outstanding bioengineering characteristics. It owns a high reputation in the fields of biorefinery and bioenergy, synthetic biology, biocatalysis and transformation, systems biology and structural biology. According to the talent cultivation modes of personality, knowledge and ability, the biotechnology specialty integrates academic scientific researches into teaching content. Talent cultivation modes include tutorial system, undergraduate-master-PhD program, the experimental class, and the interdisciplinary jointly training. The students majoring in biotechnology have a high international perspective in academic research and teaching content.

Students in biotechnology specialty are required to master the basic knowledge and practical skills of life science and biotechnology. After four-year study, the students in biotechnology will gain the knowledge and skills relevant to careers either in biotechnology or in careers that utilize the information content of, or are impacted by, including scientific research, technical development and application, further study for phD degree.

Courses of professional foundation and directions include: Biochemistry, Microbiology, Molecular Biology & Cell, Microbial Physiology and Genetics, Enzyme Engineering and Protein Engineering, Gene Engineering, Synthetic Biology, Structural Biology, Information Retrieval and Technical Writing, Bioinformatics.

Featured courses include: Molecular Biology & Cell, Enzyme Engineering and Protein Engineering, Gene Engineering, Synthetic Biology.

Professional practice includes: Biochemistry experiments, Microbiology experiments, Biotechnology experiments, Molecular Biology experiments.

Methods to improve the course learning and comprehensive quality include: tutorial system, college students' innovation and entrepreneurship contest, budding cup, and the selection of undergraduate-master-phD program.

Biomedical Engineering (BME)

Biomedical Engineering is a new major in our school. In 2015, it was first recruited for undergraduate students. Biomedical engineering is a highly interdisciplinary subject of science and engineering. It is characterized by combining engineering and life science principles and methods to propose innovative methods in the fields of biotechnology, materials, processes, instruments and information technology from the molecular to the organ level. To promote the promotion of human health, prevention, diagnosis and treatment of diseases.

Combining the characteristics of the dominant disciplines of Beijing University of Chemical Technology, the cultivation of biomedical engineering professionals highlights the integration of biology, medicine and engineering, and at the same time focuses on cultivating students' comprehensive qualities in professional environment and academic atmosphere. It not only cultivates students' solid mathematical engineering foundation, but also masters the professional theories of biomechanical modeling and simulation, biomedical signal and image processing, biomaterial preparation and testing, biomedical instrument design, human-machine system design and evaluation. After graduation, students can continue their studies at home and abroad, or in related fields such as medical devices, artificial organs, biomaterials, medical device production quality control, bioelectronics, biological system simulation, biomedical information and instruments. Scientific research, product development, teaching, management and trade.

Professional Foundation and Professional Directions include: Biochemistry, Cell Biology and Cell Engineering, Molecular Biology and Genetic Engineering, Immunology, Genetics, Biomedical Sensors, Introduction to Bioengineering, Tissue Engineering, Bio-Nano and Polymer Materials, Modern medical testing, biochemical instrumental analysis, molecular imaging, bioinformatics, biostatistics, medical safety supervision, technical economy and corporate management.

Featured courses include: biotechnology, biochemical separation engineering, biochemical reaction engineering and equipment, bioengineering environmental protection and safety technology.

Professional practice includes: biochemical experiments, microbiology experiments, molecular biology experiments, biomedical engineering professional experiments, clinical biochemical test training.

Ways to improve the course learning and comprehensive quality ability include: tutor system, science and technology innovation contest, budding cup, selection of this master, engineering practice.

Excellence Engineer Program Bioengineering Experimental Class

The Excellence Engineers Program Bioengineering Experimental Class is one of the key construction majors of the school's “211 Project”, “985 Advantage Discipline Innovation Platform” and first-class disciplines. It has been rated as the Ministry of Education and Beijing Specialty, and has passed the engineering certification of the Ministry of Education. The professional construction relies on the first batch of national key disciplines of chemical engineering and technology, the first-level discipline of materials and the first-level discipline of bioengineering of Beijing University of Chemical Technology. Implement the enrollment plan for bioengineering, biotechnology and biomedical engineering. According to the planning idea of ​​“big class enrollment and diversion training”, after entering the university, students can choose to enter bioengineering, biotechnology, or biomedical engineering, according to their own interests and wishes.

Compared with similar domestic majors, the Excellence Engineers Bioengineering Experimental Class of our university has a high reputation, in biorefinery, biological resources, bioenergy, biocatalysis and transformation, biomedical materials and synthetic biology, and has bioengineering. PhD degree in the first-level discipline. The professional training objectives and specifications have outstanding practical characteristics. The major focuses on “strengthening the project”, “pursuing excellence”, implementing the training plan, gradually turning down the weak project in teaching, gradually improving the engineering practice effect, jointly training and other overpass-type diversified training models, and expanding the internationalization of engineering talents. This major is highly integrated with international standards in academic research and teaching content.

Professional Foundation and Professional Directions include: Chemical Engineering, Biochemistry, Microbiology, Biotechnology, Biochemical Separation Engineering, Biochemical Reaction Engineering and Equipment, Bioengineering Environmental and Safety Technology, Cell Biology and Cell Engineering, Enzyme Engineering and Protein Engineering, Molecular Biology and Genetic Engineering, Introduction to Biochemical Process Design, Lectures on Engineering Practice, Information Retrieval and Technology Writing, Frontiers in Bioengineering, Introduction to Bioengineering, Bio-Industry and Entrepreneurship.

Featured courses include: biotechnology, biochemical separation engineering, biochemical reaction engineering and equipment, bioengineering environmental protection and safety technology.

Professional practice includes: biochemical experiments, microbiology experiments, biochemical process experiments, biochemical process design, molecular biology experiments, engineering training, etc.

Methods to improve the course learning and comprehensive quality ability include: tutor system, college students' innovation and entrepreneurship contest, budding cup, selection of this master, engineering practice.

Excellent Engineer Training Program of The Pharmaceutical Engineering Experimental Class

The pharmaceutical engineering major of BUCT has been selected into excellent engineer training program established by the Ministry of Education and set up the pharmaceutical engineering experimental class since 2012. After the basic course, students can decide whether to enter the pharmaceutical engineering experiment class according to their own interests and wishes. Based on the academic performance as well as interview results, we will recruit appropriate second-year undergraduate students to the pharmaceutical engineering experimental class. The engineering experiment class would exist as an independent class and the school roll of the engineering experimental class would be managed separately by the Academic Affairs Office.

The pharmaceutical engineering experimental class based on the original professional of our school has the unique characteristics and resources of pharmaceutical engineering, and has distinctive characteristics and industry advantages in synthetic drugs, bio-pharmaceuticals and natural medicines. On this basis, the construction of the pharmaceutical engineering experimental class integrates high-quality teaching resources, follows the integration and innovation characteristics of the project, and reinforces the curriculum system and teaching content with the core of strengthening engineering practice ability, engineering design ability and engineering innovation ability. By closely cooperating with schools and industry enterprises, formulating standards for personnel training, reforming the talent training model, and building a high-level engineering education faculty, efforts will be made to improve students' engineering literacy, engineering practice, engineering design and innovation capabilities.

Professional basic courses and professional direction courses include: Chemical Engineering, Biochemistry, Microbiology, Medicinal Chemistry, Industrial Pharmacy, Pharmaceutical Analysis, Drug Synthesis Reaction, Pharmaceutical Production Quality Management, Pharmaceutical Engineering Introduction, Engineering Practice Series Lectures, Information Retrieval and Technology Writing, Engineering Introduction, Frontier Lectures on Pharmaceutical Engineering.

Featured courses include: Pharmaceutical Engineering and Technology, Pharmaceutical Separation Engineering, Pharmaceutical Process Safety and Environmental Assessment, Introduction to Pharmaceutical Equipment and Process Design, etc.

Professional practice includes: biochemistry experiments, microbiology experiments, pharmaceutical engineering professional experiments, molecular biology experiments, biochemical separation experiments and design, engineering practices，etc.

The Ways to improve the course learning and comprehensive quality ability include: tutor system, college students' innovation and entrepreneurship contest, budding cup, selection of this master, engineering practice, etc.

Advanced Class of Biological Engineering

In order to further deepen the reform of personnel training, explore the model of innovative talent training and teaching methods, create favorable learning conditions for outstanding students and provide more development space, the College of Life Science and Technology began to set up “Advanced Class of Biological Engineering” from 2016 based on other pilot classes of BUCT and the experiences at home and abroad. The enrollment of Advanced Class of Biological Engineering is directly listed in the plan of BUCT. The number of students is no more than 30.

The characteristics of Advanced Class of Biological Engineering are as follows.

1. Senior professors such as Academician, Changjiang Scholar, Distinguished Young Scholar are selected as instructor for each student. Under the guidance of the instructor, students will develop individualized training programs suitable for their own characteristics, which are focused on the cultivation of science and engineering basis and foreign language abilities.

2. In the fourth year of undergraduate, student will start the MS or PhD study and enter into the high-level research group of BUCT. Some outstanding students will participate in the international joint training mode. During the PhD study, the supervisor will send students to study aboard in famous foreign university for one year to open up the international perspective of students.

3. In accordance with the principles of small-scale, high-standard, and elite education, we invite famous scholars at home and abroad to provide relevant cutting-edge science courses for students. Students are encouraged to participate academic lectures, subject research, discipline competition, etc. Students also have opportunities for academic exchanges at home and abroad.

This major is dedicated to cultivate students with the basic scientific principles, basic technologies, technological processes and engineering design of modern biology, biological engineering and related industrialization. Students are expected to have a high sense of social responsibility and professional ethics, strong engineering practices, communication skills, teamwork and self-learning abilities. Students will be able to work in the area of biochemical to develop new technologies, products, engineering design, and also engage in the related production operation and managements.