

Bachelor of Science in Biotechnology

Program Description and Curriculum Guide

Program Code: 071002

(Course conducted in English)

I. Educational Objectives

This major relies on the advantages of running a comprehensive university, makes full use of the high-quality resources of the university in the field of biology for both education and teaching, and meets the demands of national development strategy. This program aims to cultivate high-quality talents with excellent professional quality and morality, good academic foundation in mathematical and physical science, solid basic knowledge and skills of modern biotechnology, innovative ability, international vision, and understanding of Chinese culture and society. Students are able to apply the theoretical knowledge and skills into practice and participate in scientific research and technology development in biotechnological and related fields, thus serving economic and social development. Students of this major are well equipped with professional foundations and have development potential for further study pursuing Master and/or Doctor Degree either at home or abroad.

Specific objectives are as follows:

- 1.Be equipped with excellent professional quality and morality, be ready to shoulder social responsibilities, abide laws and regulations, and adhere to professional ethics. Have the basic ability to communicate in Chinese.
- 2.Be capable of adapting to the development of biotechnology, have the ability to integrate basic knowledge of mathematics, physics, chemistry and biology, master the methods and means of biotechnology research, and have the ability to discover, propose, analyze and solve biotechnology-related problems.
- 3.Consciously track the theoretical frontiers and the latest developmental trends of biotechnology, as well as the general development situations in biotechnology industry. Show innovative spirit and practical ability, and be able to use modern biotechnology research platforms to conduct preliminary research and practice.
- 4.Be of physically and mentally healthy, full of humanistic quality, team spirit and good at

communication skills. Be competent to lead the preliminary organization and management needed in the Research & Development (R&D) project team of small and medium-sized enterprises.

5. Have a sense of globalization and an international perspective, develop the habit and ability of lifelong learning, are capable of expanding their own knowledge and abilities through appropriate channels, and actively adapt to the changing domestic and international situations and professional environment.

II. Attributes & Competencies

Students of this major should meet the following requirements when they apply for graduation.

1. Chinese language level: The Chinese Proficiency should reach the Level 4 of *Chinese Proficiency Grading Standards for International Chinese Language Education*.

2. Moral norms: Have good moral qualities and comprehensive qualities, respect Chinese culture and customs.

3. Basic knowledge: Have a solid foundation in biology discipline, and have basic qualities in computer and bio-information sciences.

4. Professional knowledge: Master the basic theories, knowledge and skills of biological science and biotechnology, and be familiar with the basic principles and methods of biotechnology, as well as the relevant product development.

5. Design and R&D: Have the ability to comprehensively put the theoretical knowledge and skills into practical application, engage in product R&D in biotechnology and relevant fields, and have the initial ability to carry out innovative experiments.

6. Use modern tools: Be able to read professional journals and documents in English, can communicate in Chinese and are skilled at scientific writing, master the basic methods of data inquiry and literature retrieval, can use modern information technology to obtain relevant information.

7. Communication and consciousness of team spirit: Master certain basic knowledge of humanities and social sciences, have good humanistic qualities, consciousness of team cooperation and healthy interpersonal communication.

8. Profession and society: Understand the development history, current situation, domestic and foreign research frontiers and latest technology trends in the field of biotechnology, be familiar with development trends in biological industry, and understand relevant policies and regulations in

biotechnology industry.

9.Scientific research: Have preliminary abilities in scientific research and activities, have strong academic interest, are capable of critical thinking, possess certain abilities in experimental design, data induction, collation and analysis, be able to write academic papers and participate in academic communications, have the potential to adapt to the needs of the society and pursue further study.

10.Communication and cooperation: Have international perspectives and the ability of cross-cultural communication, competition and cooperation.

III.Systems

4 years

IV. Discipline

Biology

V. Degree Program

Bachelor degree of Science

VI. Degree Courses

Biochemistry, Cellular Biology, Microbiology, Molecular Biology, Genetics, Genetic Engineering, Enzyme Engineering, Cellular Engineering, Ecology

VII. Course Credits & Hours

Table 1 Course Modules and Credits

Course modules	Category	Credits	Hrs	%	Credits (T)	Hours (T)	Credits (P)	Hours (P)
General courses	Compulsory courses	31.5	608	20.1	26	432	5.5	176
	Selective courses	6	96	3.8	6	96	/	/
Disciplinary and professional courses	Fundamental courses	9.5	168	6.1	8.5	136	1	32
	Core courses	35	704	22.3	26	416	9	288
Open and integrated courses	Selective courses for this major	45	880	28.7	35	560	10	320
	Cross-open courses	8	136	5.1	7.5	120	0.5	16
Innovation and Practice	Innovation and entrepreneurship education (optional)	2	32	1.3	2	32	/	/
	Practical teaching	20	640	12.7	/	/	20	640
Total		157	3296	100	111	1792	46	1472
T (Theoretical Lectures), P (Practice/Lab Sessions)								

VIII. Curriculum System

Table 2 Available Courses for Each Semester

Term	Course name	Credit	Hour	Term	Course name	Credit	Hour
Term 1	Introduction to China	4	72	Term 2	Basic Chinese II	4	64
	Basic Chinese I	4	64		Physical Education II	1	32
	Physical Education I	1	32		Fundamental of Computer Science and Programming	4.5	88
	College Chemistry B	4	64		Biochemistry(2)	4	80
	Experiment of College Chemistry B	1	32		Microbiology	4	80
	Introduction Course of Computer Science	3	48		Bioinformatics	2	40
	Biotechnology and Contemporary Society	2	32		New Media and Society (bilingual Lecture)	2	32
	Professional introduction to the Major	2.5	40		Selective courses for this major	9(suggested)	
	Biochemistry(1)	4	80		Pharmaceutical Plants(selective)	2	40
	Optional Course	2	32		Biological big data mining and application(selective)	3	48
	Optional Course	2	32		Zoology(selective)	4	80
	Selective courses for this major	2 (suggested)					
	Pharmaceutical Plants (selective)	2	40				
	Total	32.5	616		Total	30.5	584
Term 3	Applied Chinese I	4	64	Term 4	Applied Chinese II	4	64
	Physical Education III	1	32		Physical Education IV	1	32
	Genetics	4	80		Cell Engineering: Animal Cell Engineering and Technology	2	48
	Molecular Biology	3	48		Enzyme Engineering	2.5	48
	Cellular Biology	4	80		Ecology	2.5	48
	Selective courses for this major	4(suggested)			Selective courses for this major	6(suggested)	
	Human and Animal Physiology(selective)	4	80		Biological Instrumental Analysis(selective)	3	64
	Innovation and Practice courses	1(suggested)			Immunology(selective)	3	64

	Foundations of Innovation	1	16		Practical teaching		
	Training of Innovative Thinking	1	16		Research Practice Training	1	32
	Total	21	400		Total	19	400
Term 5	Cell Engineering : Plant Cell Engineering and Technology	2	48	Term 6	Scientific Writing	3	48
	Genetic Engineering	3	64		Biostatistics and Experiment Design	3	48
	Selective courses for this major	14.5(suggested)			Selective courses for this major	8.5(suggested)	
	Plant Physiology(selective)	4	80		Plant Resources (selective)	2.5	48
	Pharmaceutical Analysis(selective)	3	48		Pharmacology (selective)	4	64
	Fermentology(selective)	4.5	96		Structural Biology (selective)	2	32
	Bio-separation and Purification(selective)	3	64		Proteomics	2	32
	Genomics	2	32		Professional Skill Training (including Comprehensive Experiment of Bioscience and Biotechnology)	3	96
	Apparent Genetics	2	32				
	Evolutionary Biology	2	32				
	Biodiversity and Conservation	2	32				
	Innovation and Practice courses	1(suggested)					
	Guidance and Training of Scientific and Technological Innovation	1	16				
	Innovative Entrepreneurship and Practice Innovative Entrepreneurship and Practice	1	16				
	Innovation Entrepreneurship and Leadership	1	16				
	Total	20.5	416		Total	17.5	336
Term 7	Graduation Practice (Graduation Thesis)	7	224	Term 8	Innovation and Practice courses		
					Entrepreneurship and Employment Guidance for College Students	2	32
					Graduation Practice (Graduation Thesis)	9	288
	Total	7	224		Total	11	320

IX. Guidelines

1. The maximum length of study: 8 years
2. Minimum credit requirements for graduation: 157 credits