

# 生物科学（菁英班）专业培养方案

**专业名称与代码：**生物科学，071001

**专业培养目标：**

本专业培养适应生物科学发展与技术进步需要的德、智、体全面发展的高级专门人才。具有扎实的数学、物理、化学、生物科学和环境地球科学的基础理论知识，掌握生物科学的理论和实践工作技能及基本的地球科学实验和鉴定技术，具备从事分子生物学、生态学与环境地球科学等方面的基础理论研究、应用研究、分析实验、数据处理等工作的基本能力。具有计算机软、硬件的基础知识，掌握一门以上计算机语言的编程技术，能熟练将计算机文字、图形、数据等处理并应用于生物科学与技术研究。掌握一门外语，具备听、说、读、写及进行国际学术交流的能力，达到能独立获取信息的水平。具有一定的人文科学和管理科学的知识和能力。具有较强的创新意识、实践能力和科学素养。落实《学生素质能力提升计划》，着力提升学生的三项素质和四项能力，即思想道德素质、科学人文素质、身心健康素质，创新创业能力、组织领导能力、交流表达能力、国际理解能力。本科毕业生能进入相关企、事业单位从事生物制品开发研究与生态环境调查评价、管理与规划，或作为学术后备力量进入国内外科研机构和高等院校继续研究生学习，从事生物学（含生物医学）、生态学、环境地球科学等领域的研究。

**专业毕业要求：**

1. 基础知识：掌握坚实的数、理、化、外语、计算机基础知识与应用能力；
2. 问题分析：掌握生物科学的基本理论、基本知识以及生物科学的分析方法/设计方法/技术；能够应用这些方法/技术，识别、表达、并通过文献研究分析分析相关学科专业问题，以获得有效结论；
3. 设计/开发解决方案：能够设计/开发生物科学专业问题的解决方案，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素；
4. 研究：能够基于生物科学专业所掌握的原理、技术、方法对相关问题进行研究，并通过信息综合得到合理有效的结论；
5. 使用现代工具：能够针对生物科学专业问题，选择与使用恰当的现代技术工具，包括对问题的预测与模拟，并能够理解其局限性；
6. 专业与社会：能够基于生物科学专业相关背景知识进行合理分析，评价问题解决方案对社会、环境、健康、安全、法律、文化以及可持续发展的影响，并理解应承担的责任；
7. 职业规范：具有生物科学专业所应具有的职业道德和规范；

8. 个人和团队：能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色；
9. 管理与沟通：理解并掌握相关管理与决策方法，能够就生物科学专业问题与业界同行及社会公众进行有效沟通和交流，并具备一定的国际视野，能够在跨文化背景下进行沟通和交流；
10. 终身学习：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

**毕业要求实现及途径：**

序号	毕业要求	实现途径（教学过程）
1	掌握坚实的数、理、化、外语、计算机基础知识与应用能力	①课堂教学：高等数学、大学物理、大学化学、分析化学、有机化学、大学英语等 ②课外学习：课外练习+实践
2	掌握生物科学的基本理论、基本知识以及生物科学的分析方法/设计方法/技术；能够应用这些方法/技术，识别、表达、并通过文献研究分析分析相关学科专业问题，以获得有效结论	①课堂教学：植物生物学、动物生物学、微生物学、生物化学、植物学实验、动物学实验、微生物学实验、生物化学实验等 ②课外学习：课外练习+实践+文献阅读
3	能够设计/开发生物科学专业问题的解决方案，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素；	①课堂教学：分子生物学、基因工程、植物生态学、湿地生态学、环境地球科学导论等 ②课外学习：课外练习+实践
4	能够基于生物科学专业所掌握的原理、技术、方法对相关问题进行研究，并通过信息综合得到合理有效的结论	①课堂教学：生物信息学、多组学与大数据处理等 ②课外学习：课外练习+实践
5	能够针对生物科学专业问题，选择与使用恰当的现代技术工具，包括对问题的预测与模拟，并能够理解其局限性	①课堂教学：Python 语言程序设计 A、R 语言与生物统计等 ②课外学习：课外练习+实践
6	能够基于生物科学专业相关背景知识进行合理分析，评价问题解决	①课堂教学：生态学概论、保护生物学、应用藻类学、植硅体与环境等

序号	毕业要求	实现途径（教学过程）
	方案对社会、环境、健康、安全、法律、文化以及可持续发展的影响，并理解应承担的责任	②课外学习：课外练习+实践
7	具有生物科学专业所应具有的职业道德和规范	①课堂教学：思想道德修养与法律基础、马克思主义基本原理概论、毛泽东思想和中国特色社会主义理论体系概论等 ②课外学习：课外实践
8	能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色	①课堂教学：创新创业选修课等 ②课外学习：课外实践
9	理解并掌握相关管理与决策方法，能够就生物科学专业问题与业界同行及社会公众进行有效沟通和交流，并具备一定的国际视野，能够在跨文化背景下进行沟通和交流	①课堂教学：创新创业自主学习 ②课外学习：社会调查、学科竞赛、文献阅读、科研报告
10	具有自主学习和终身学习的意识，有不断学习和适应发展的能力	①课堂教学：相关通选课、专业选修课等 ②课外学习：课外练习+实践

**主干学科：**

生物学、生态学

**专业核心课程：**

植物生物学、动物生物学、生物化学、微生物学、细胞生物学、遗传学、分子生物学、普通生态学、生物信息学

**主要专业实验：**

植物生物学实验、动物生物学实验、生物化学实验、微生物学实验、细胞生物学实验、遗传学实验、分子生物学实验

**主要实践性教学环节：**

植物学野外实习、生态学野外实习、地质与海洋生物野外实习、计算机语言编程课程设计、毕业实习、毕业设计

**毕业学分要求：**

169.5 学分

**学制与学位：**

四年，理学学士学位

**本专业学生可以辅修的其他专业：**

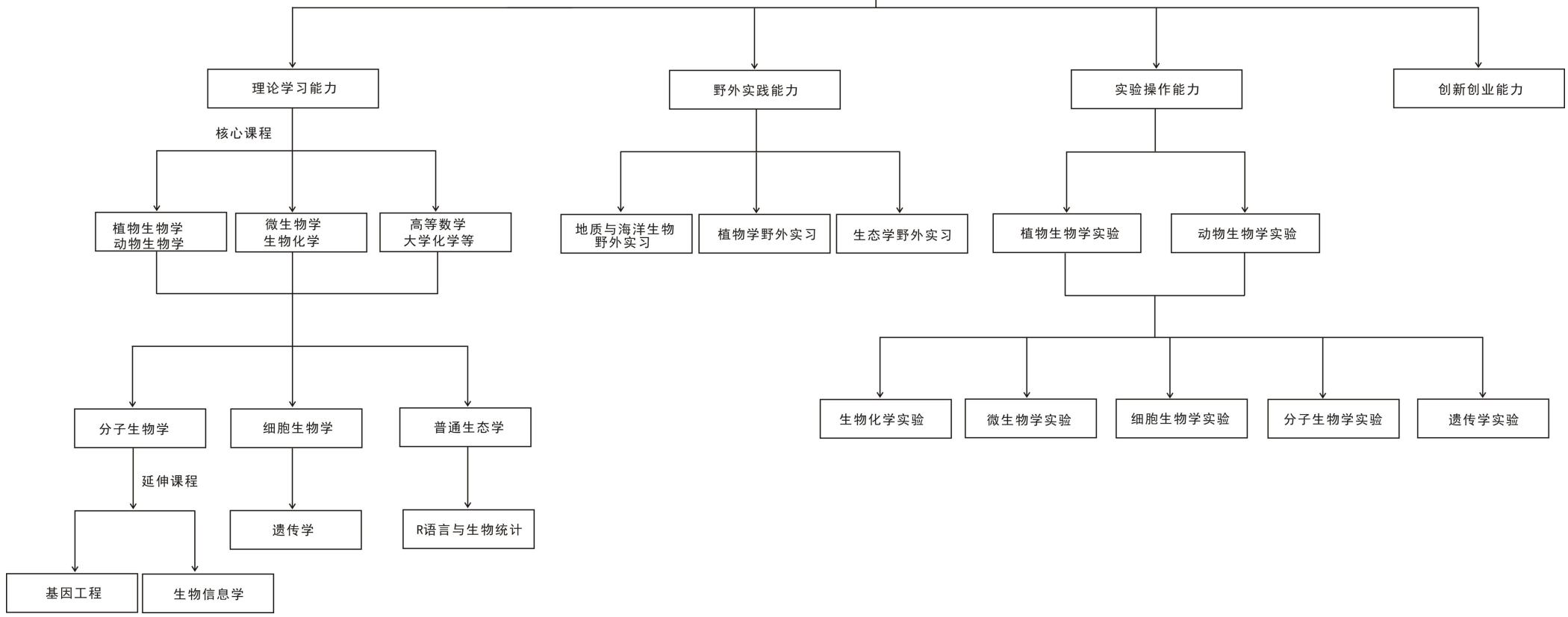
环境工程

**相近专业：**

生物技术、生态学

生物科学专业培养目标及定位

培养目标分解





## **Program for Bioscience (Elite Class)**

**Specialty and Code:** Bioscience, 071001

### **Education Objectives:**

This program aims at cultivating high-level specialized talents with all-round development of morality, intelligence and physique that meet the demand of the development of biological science and technological progress. Graduates are expected to have solid basic theoretical knowledge of mathematics, physics, chemistry, biological science and geology; master the theoretical and practical working skills of biological science and basic geoscience experiments and identification techniques; have basic theoretical research, applied research, analytical experiments and data processing abilities in molecular biology, ecology and environmental geoscience; obtain the basic knowledge of computer software and hardware; master the programming technology of more than one computer language; be proficient in the processing of computer words, graphics, data and other applications in biological science and technology research; master a foreign language with the ability to listen, speak, read, write and conduct international academic exchanges, so as to achieve the level of independent access to information; have innovation awareness, practical competence and science attainment. Emphasis will be put in the cultivation of three qualities and four capabilities, viz. moral standard, scientific and humanistic attainment, physical and psychological health, innovation, leadership, communicative skills, and cross-cultural awareness. Undergraduates should have career competence in relevant enterprises and institutions to engage in research and development of biological products and ecological environment investigation, evaluation, management and planning, or have academic potential to enter domestic and foreign scientific research institutions and institutions of higher learning to continue postgraduate study in frontier research fields in Biology (including Biomedicine), Ecology, Environmental Geoscience, etc.

### **Graduation Requirements:**

Students are expected to

1. **Basic Knowledge:** have solid basic knowledge and application ability of mathematics, physics, chemistry, foreign language, and computer.
2. **Problem Analysis:** master the basic theories and knowledge of bioscience and the analytical methods/design methods/techniques of bioscience, and be capable of applying these methods/techniques to identify, express, and analyze the professional problems of related disciplines through literature research and analysis in order to obtain effective conclusions.
3. **Solution Design/Development:** design/develop solutions to professional problems in

bioscience, and embody innovative awareness in the design process, while considering social, health, safety, legal, cultural and environmental factors.

4. **Research:** conduct research based on the principles, techniques and methods mastered through majoring in bioscience, and obtain reasonable and effective conclusions through information synthesis.

5. **Modern Tool Application:** select and use appropriate modern technology tools to tackle bioscience-related problems, including problem prediction and simulation, while understanding their limitations.

6. **Specialty and Society:** conduct reasonable analysis of social-related issues based on relevant background knowledge of bioscience, while considering the impact of solutions on society, environment, health, safety, law, culture and sustainable development, and understand the corresponding responsibility.

7. **Professional Norms:** have professional ethics and norms of bioscience.

8. **Individual and Teamwork:** be capable of taking the roles of individuals, team members and team leaders in a multi-disciplinary context.

9. **Management and Communication:** understand and master relevant management and decision-making methods; be capable of effectively communicating with industry peers and the public on professional issues of bioscience with an international vision in cross-cultural context.

10. **Lifelong Learning:** have the awareness of autonomous and lifelong learning, and the ability of constant learning and adaptation.

#### Graduation Requirements and Pathways:

No.	Graduation Requirements: Graduates are expected to	Pathways (Teaching Process)
1	To have solid basic knowledge and application ability of mathematics, physics, chemistry, foreign language, and computer.	① <b>Classroom Teaching :</b> Advanced Mathematics, University Physics, University Chemistry, Analytical Chemistry, Organic Chemistry, College English, etc. ② <b>Extracurricular Learning :</b> Extracurricular Exercise + Practice
2	To master the basic theories and knowledge of bioscience and the analytical methods/design methods/techniques of bioscience, and be capable of applying these methods/techniques to identify, express, and analyze the professional problems of related disciplines through literature	① <b>Classroom Teaching :</b> Plant Biology, Animal Biology, Microbiology, Biochemistry, Botanical Experiments, Zoological Experiments, Microbiological Experiments, Biochemical Experiments, etc. ② <b>Extracurricular Learning :</b> Extracurricular Exercise + Practice + Reading literature



No.	Graduation Requirements: Graduates are expected to	Pathways (Teaching Process)
	research and analysis in order to obtain effective conclusions.	
3	To design/develop solutions to professional problems in bioscience, and embody innovative awareness in the design process, while considering social, health, safety, legal, cultural and environmental factors.	<p>① <b>Classroom Teaching</b> : Introduction to Molecular Biology, Gene Engineering, Plant Ecology, Wetland Ecology, Environmental Geosciences, etc.</p> <p>② <b>Extracurricular Learning</b> : Extracurricular Exercise + Practice</p>
4	To conduct research based on the principles, techniques and methods mastered through majoring in bioscience, and obtain reasonable and effective conclusions through information synthesis.	<p>① <b>Classroom Teaching</b> : Bioinformatics, Multi-omics and Big Data Processing, etc.</p> <p>② <b>Extracurricular Learning</b> : Extracurricular Exercise + Practice</p>
5	To select and use appropriate modern technology tools to tackle bioscience-related problems, including problem prediction and simulation, while understanding their limitations.	<p>① <b>Classroom Teaching</b> : R Language and Biostatistics, Python Language Programming A, etc.</p> <p>② <b>Extracurricular Learning</b> : Extracurricular Exercise + Practice</p>
6	To conduct reasonable analysis of social-related issues based on relevant background knowledge of bioscience, while considering the impact of solutions on society, environment, health, safety, law, culture and sustainable development, and understand the corresponding responsibility.	<p>① <b>Classroom Teaching</b> : Introduction to Ecology, Conservation Biology, Phytolith and Environment, Applied Phycology, etc.</p> <p>② <b>Extracurricular Learning</b> : Extracurricular Exercise + Practice</p>
7	To have professional ethics and norms of bioscience.	<p>① <b>Classroom Teaching</b> : Principles of Marxism, Introduction to Mao Tse-tung Thought and the Theoretical System of Socialism with Chinese Characteristics, Morality Education and Fundamentals of Law, etc.</p> <p>② <b>Extracurricular</b> : Practice</p>

No.	Graduation Requirements: Graduates are expected to	Pathways (Teaching Process)
8	To be capable of taking the roles of individuals, team members and team leaders in a multi-disciplinary context.	① <b>Classroom Teaching</b> : Innovation and entrepreneurship elective course, etc. ② <b>Extracurricular Learning</b> : Practice
9	To understand and master relevant management and decision-making methods; be capable of effectively communicating with industry peers and the public on professional issues of bioscience with an international vision in cross-cultural context.	① <b>Classroom Teaching</b> : Innovation, entrepreneurship and independent learning. ② <b>Extracurricular Learning</b> : Social Survey, Subject Competition, Literature Reading, Scientific Research Report
10	To have the awareness of autonomous and lifelong learning, and the ability of constant learning and adaptation.	① <b>Classroom Teaching</b> : General elective courses, professional elective courses, etc. ② <b>Extracurricular Learning</b> : Extracurricular Exercise + Practice

**Major Disciplines:**

Biology, Ecology

**Core Courses:**

Plant Biology, Animal Biology, Biochemistry, Microbiology, Cell Biology, Genetics, Molecular Biology, General Ecology

**Lab Experiments:**

Experiments of Plant Biology, Experiments of Animal Biology, Experiments of Biochemistry, Experiments of Microbiology, Experiments of Cell Biology, Experiments of Genetics and Experiments of Molecular Biology

**Practical Work:**

Field Practice in Botany, Field Practice in Ecology, Field Practice in Geology and Marine Life, Computer Program Design Practice, Graduation Practice and Design.

**Required Credits for Graduation:** 169.5 credits

**Duration & Degree Granted:**

Four years, Bachelor of Science degree

**Recommended Minors:**

Environmental Engineering

**Related Specialties:** Biotechnology, Ecology

生物科学（菁英班）专业课程教学计划表

Course Descriptions of BioScience (Elite Class)

课程类别 Classification		课程编号 Code	课程名称 Course Name	学分 Crs	课内总学时 Hrs	学时分类 Class Hours					先修课程 Prerequisite courses	学期学分分配 Semester Credits							
						课内学时		课外学时				一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
						讲课 Lec.	课内实验 Lab	实验/科研实践 Lab/Res.	研讨 Dis	素质拓展 Exp									
通识教育课 Liberal Education Course	必修 Compulsory	11706200	马克思主义基本原理概论 Principles of Marxism	3	48	48								3					
		11706500	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Tse-tung Thought and the Theoretical System of Socialism with Chinese Characteristics	4	64	64								4					
		11711800	中国近现代史纲要 The Essentials of Modern Chinese History	2	32	32						2							
		12005200	思想道德修养与法律基础 Morality Education and Fundamentals of Law	3	48	48						3							
		21929201	Python 语言程序设计 A [Python Language Programming A] (56=40+16)	2.5	56	40		16					2.5						
		12005300	形势与政策 Situation and Policy	2	32	32						每学期平均分配							
		113076*0	体育 Physical Education	4	144	144						1	1	1	1				
		109234*0	大学英语 College English	9	144	144				48		3	3	3					
		12005300	军事理论 Military Theory	1	16	16						1							
	选修 Elective	20428800	地球系统科学概论 Introduction to Earth Sciences	2	32	24	8					2							
		70400600	生态学概论 Ecology	1.5	24	24								1.5					
				包括地球系统科学概论、生态学概论两门必修课程总计 12 学分，含创新创业选修课学分，跨学科选修课不低于 4 学分	8.5	136	136												
		小计 Sum		42.5	776	752	8	16	0	48	0	12	6.5	12.5	1	0	0	0	0
大类专业课 Platform Courses	20430100	微生物学基础 Foundations in Microbiology	1.5	24	24							1.5							
	20430200	环境地球科学大类导论课 Introduction to Environmental Earth Sciences	0.5	8	8								0.5						
	212127*2	高等数学 B Advanced Mathematics B	10	160	160						4	6							
	21206300	数学实验 Mathematic Experiments	1	16	16							1							

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 Crs	课内总学时 Hrs	学时分类 Class Hours					先修课程 Prerequisite courses	学期学分分配 Semester Credits							
					课内学时		课外学时				一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
					讲课 Lec.	课内实验 Lab	实验/科研实践 Lab/Res.	研讨 Dis	素质拓展 Exp									
	21212803	线性代数 C Linear Algebra C（水文环境）	2	32	32								2					
	21213503	概率论与数理统计 C Probability and Statistics C	2	32	32								2					
	212130*3	大学物理 C College Physics C	6	96	96							3.5	2.5					
	21216902	物理实验 B Physical Experiments B	1.5	48	4	44						1.5						
	20326903	大学化学 C College Chemistry C	3	48	48							3						
	20327003	大学化学实验 C College Chemistry Experiment C	1	24		24						1						
	20119600	普通地质学 Physical Geology	2.5	48	40		8				2.5							
	21130401	测量学 A Surveying A	2	48	32		16					2						
	小计 Sum		33	584	492	68	24	0	0	0	6.5	19.5	7	0	0	0	0	0
学科基础课 Disciplinary Fundamental Courses	20327302	有机化学 B Organic Chemistry B	2.5	40	40								2.5					
	20327402	有机化学实验 B Organic Chemistry Experiment B	1	24		24							1					
	20327102	分析化学 B Analytical Chemistry B	1.5	24	24								1.5					
	20327202	分析化学实验 B Analytical Chemistry Experiment B	1	24		24							1					
	20113100	矿物岩石学 Mineralogy and Lithology	3	48	10	38						3						
	20101600	地貌学及第四纪地质学 Geomorphology and Quaternary Geology	2.5	40	36	4							2.5					
	小计 Sum		11.5	200	110	90	0	0	0	0	0	3	2.5	6	0	0	0	0
专业主干课 Main Specialty Courses	20431400	动物生物学 Zoology	3	48	48								3					
	20431300	植物生物学 Plant Biology	3	48	48								3					
	20420700	生物化学 Biochemistry	4.5	72	72								4.5					
	20419900	细胞生物学 Cell Biology	3	48	48									3				
	20432500	微生物学 Microbiology	1.5	24	24										1.5			
	20420100	遗传学 Genetics	3	48	48									3				
	20431900	植被生态学 Vegetation ecology	1.5	24	24								1.5					
	20416000	分子生物学 Molecular Biology	3.5	56	56											3.5		

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 Crs	课内总学时 Hrs	学时分类 Class Hours					先修课程 Prerequisite courses	学期学分分配 Semester Credits							
					课内学时		课外学时				一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
					讲课 Lec.	课内实验 Lab	实验/科研实践 Lab/Res.	研讨 Dis	素质拓展 Exp									
	20424200	生物信息学 Bioinformatics	2	32	32											2		
	20432600	R 语言与生物统计 R Language and Biostatistics	1.5	40	24		16							1.5				
	小计 Sum		26.5	440	424	0	16	0	0	0	0	0	0	12	7.5	7	0	0
专业选修课 Specialty Elective Courses		可按方向设课，具体见专业选修课列表	15	240	240													
合计 Sub-total			128.5	2240	2018	182	40	0	48	0	18.5	29	22	19	7.5	7	0	0
实践环节 Practical Work	44300400	军事训练 Military Training	1	2 周							1							
	41928500	Python 语言课程设计 A Course Design for Python Language A	1.5	1.5 周								1.5						
	40438800	地质与环境认识实习（北戴河） Primary Field Training (Beidaihe)	3	2 周 +1 周								3						
	40432700	动物生物学实验 Experiments of Zoology	1	24		24								1				
	40432800	植物生物学实验 Experiments of Plant Biology	1.5	36		36								1.5				
	40432900	生物化学实验 Experiments of Biochemistry	2	48		48								2				
	40433000	细胞生物学实验 Experiments of Cell Biology	1	24		24									1			
	40433100	微生物学实验 Experiments of Microbiology	1.5	36		36										1.5		
	40433200	遗传学实验 Experiments of Genetics	1	24		24									1			
	40433300	分子生物学实验 Experiments of Molecular Biology	1.5	36		36										1.5		
	40424300	植物学现场教学 Botanical Field Practice	1	1 周										1				
	40433400	生态学教学实习(三峡) Ecology Field Practice	2	2 周										2				
	40433500	植物学教学实习 Plant Biology Field Practice	2	2 周										2				
	40421600	毕业实习    Graduation Practice	8	8 周													8	
	40421700	毕业设计    Graduation Design	8	8 周														8

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 Crs	课内总学时 Hrs	学时分类 Class Hours					先修课程 Prerequisite courses	学期学分分配 Semester Credits							
					课内学时		课外学时				一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
					讲课 Lec.	课内实验 Lab	实验/科研实践 Lab/Res.	研讨 Dis	素质拓展 Exp									
	小计 Sum		36	228+ 27.5周		228					1	4.5		9.5	2	3	8	8
创新创业自主学习 Freedom study	ZZ35000S	社会调查 Social Investigation																
		其他(学科竞赛、发明创造、科研报告) Others (Contest, Invention, Innovation and Research Presentation)	3															
	小计 Sum		5															
总计 Total			169.5	2468+27.5周	2018	410	40	0	48	0	19.5	33.5	22	28.5	9.5	10	8	8
可开出专业选修课列表 Specialty Elective Courses	20400100	保护生物学 Conservation Biology	2	32	32									1.5				
	20105900	生物地球化学 Biogeochemistry	2	32	32									2				
	20433600	应用藻类学 Applied Phycology	1.5	24	24											1.5		
	20433700	植硅体与环境 Phytolith and Environment	1.5	24	24												1.5	
	22040800	湿地生态学 Wetland Ecology	1.5	24	24												1.5	
	20433800	动物生理学 Animal Physiology	1.5	32	24	8								1.5				
	20433900	植物生理学 Plant Physiology	1.5	32	24	8								1.5				
	20434000	生态保护与生态文明 Ecological Conservation and Eco-civilization	1.5	24	24											1.5		
	20424800	分子生态学 Molecular Ecology	2	32	32									2				
	20411400	细胞工程 Cell Engineering	2	32	32											2		
	20406300	基因工程 Genetic Engineering	2	32	32											2		
	20406400	进化生物学 Evolutionary Biology	2	32	32												2	
	20434100	系统生物学基础 Foundations of Systems Biology	1.5	24	24											1.5		
	20417500	功能基因组学 Functional Genomics	1.5	24	24											1.5		
	20434200	多组学与大数据处理 Multi-omics and Big Data Processing	1.5	24	24											1.5		

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 Crs	课内总学时 Hrs	学时分类 Class Hours					先修课程 Prerequisite courses	学期学分分配 Semester Credits							
					课内学时		课外学时				一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
					讲课 Lec.	课内实验 Lab	实验/科研实践 Lab/Res.	研讨 Dis	素质拓展 Exp									
	20434300	合成生物学导论 Introduction to Synthetic Biology	1.5	24	24									1.5				
	20406600	免疫学概论 Essential Immunology	1.5	24	24												1.5	
	20434400	天体生物学 Astrobiology	1.5	24	24												1.5	
	20433500	发酵工程 Fermentation Engineering	1.5	32	24	8										1.5		
	20411100	微生物生态学 Microbial Ecology	2	32	32										2			
	20434600	肠道微生物学 Intestinal Microbiology	1.5	24	24											1.5		
	20434700	微生物组学 Microbiomics	1.5	24	24											1.5		
	20427200	微生物生态毒理 Microbioal Ecotoxicology	1.5	24	24												1.5	

注：全英课程须在课程名称后打\*标出，通识教育选修课学分未列入具体学期，学院须根据学校创新创业自主学习学分认定一览表制订实施细则。

## 生物科学（菁英班）专业课程分类统计

## Course Classifications and Statistics of Bioscience (Elite Class)

课程类别 统计	通识教育课程 Liberal Education Courses		大类平台课+学科基础课 Platform & Disciplinary Fundamental Courses	专业主干课 Main Specialty Courses	专业选修课 Specialty Elective Courses	实践环节 Practical Work	创新创业自主学习 Freedom Study	学时总计 Total Hour	学分总计 Total Credits
	必修	选修							
学时/学分	584/30.5	192/12.0	584+200/33+11.5	440/26.5	240/15	228+27.5 周/36	80/5	2428+27.5 周	169.5
学分所占比例	25.1%		26.3%	15.6%	8.8%	21.2%	3%		100%

生物科学专业辅修课程教学计划表  
Course Descriptions of Bioscience (Minor)

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 Crs	学时 Hrs	学时分类 Class Hours				先修课程 Prerequisite courses	学期学分分配 Semester Credits							
					讲课 Lec.	实验/科研实践 Lab/Res.	研讨 Dis	素质拓展 Exp		一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
学科基础课 Fundamental Courses	20431300	植物生物学 Plant Biology	3	48	48									3			
	20431400	动物生物学 Zoology	3	48	48									3			
	20430400	微生物学 Microbiology	3	48	48										3		
	小计 Sum		9	144	144									6	3		
专业主干课 Main Specialty Courses	20420700	生物化学 Biochemistry	4.5	72	72									4.5			
	20420100	遗传学 Genetics	3	48	48												3
	20416000	分子生物学 Molecular Biology	3.5	56	56											3.5	
	20419900	细胞生物学 Cell Biology	3	48	48											3	
	小计 Sum		14	224	224									4.5	6.5	3	
合计 Sub-total																	
实践环节 Practical Work	40431600	综合实验 Comprehensive Experiment	2	32		32											2
	小计 Sum																
总计 Total			25	400	368	32								6	7.5	6.5	5

生物科学辅修专业课程分类统计  
Course Classifications and Statistics of Bioscience (Minor)

课程类别 统计	学科基础课 Disciplinary Fundamental Courses	专业主干课 Main Specialty Courses	实践环节 Practical Work	学时总计 Total Hour	学分总计 Total Credits
学时/学分	144/9	224/14	32/2	400	25
学分所占比例	36%	56%	8%		100%