

生物科学专业培养方案

专业名称与代码：

生物科学，071001

专业培养目标：

本专业致力于培养受到社会主义核心价值观熏陶，有能力有意愿服务社会，爱岗敬业的新时代青年人才，使其德、智、体、美、劳全面发展，具有良好的社会责任感和道德修养。培养具有坚实的生物科学和环境地球科学基础理论知识，以及扎实的实验技能和较强的创新思维。具有计算机软、硬件的基础知识，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的研究。具备良好的科学素质和较强创新能力以及团队合作精神，能够适应生物科学发展与技术进步的需要，并且具有良好的人文社会科学和管理科学的知识与素养，成为专业精深、知行合一的高素质创新型人才，能够在生物学领域从事教育教学、科学研究、科技管理、科普创作等工作。

培养目标可以分解为如下5个子目标：

目标1：具有高尚的职业道德和高度的社会责任感，了解国家及生物相关法律法规、法规和规章，爱岗敬业、乐于奉献的新时代青年人才。

目标2：具有良好的自然科学与人文科学素养，具备数学、物理、化学、计算机、外语和管理等方面的应用基础。

目标3：具有坚实的生物科学基础理论知识，能够掌握专业相关的实验技能，具有较强的创新思维，可开展生物类研究与实践。

目标4：具有丰富的生命科学、环境科学、地球科学、计算机科学等多学科理论和实践经验，具备分析和解决相关领域生产生活方面的问题。

目标5：具有良好的表达沟通能力，能够从事教育教学、科学研究、科技管理、科普创作等工作。

专业毕业要求：

1. 基础知识：具有扎实的数学、物理、化学、英语和生物的基础理论和基本知识。
2. 问题分析：掌握生物科学的理论和实践工作技能，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、处理数据等工作的基本能力；能够运用这些技术、方法与能力，识别、表达、并通过文献研读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、监测和管理环节中体现创新意识，能够考虑社会、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、讨论分析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，选择与使用生物信息学、R 语言、Python 语言等现代技术工具，对问题进行分析、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：具有生物科学专业应具有的职业道德和规范。

8. 个人和团队：应具有较强的团队协作意识，能够撰写报告和设计文稿、陈述发言、清晰表达，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，能够基于职业发展需求不断学习，适应职业发展。

毕业要求实现及途径：

序号	毕业要求	实现途径（教学过程）
1	基础知识：具有扎实的数学、物理、化学、英语的基础理论、基本知识。	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	问题分析：掌握生物科学的理论 and 实践工作技能；能够运用技术、方法，并通过文献研读对学科专业问题进行分析。	① 课堂教学 ：植物生物学、动物生物学、微生物学、生物化学等 ② 课外学习 ：课外练习、实践、文献阅读
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，能体现创新意识。	① 课堂教学 ：分子生物学、基因工程、植物生态学、微生物生态学等 ② 课外学习 ：课外练习、实践、毕业实习、毕业设计
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。	① 课堂教学 ：植物生物学实验、动物生物学实验、生物化学实验、遗传学实验、分子生物学实验、植物现场教学等 ② 课外学习 ：学生科研立项、科技论文报告会、生物实验技能大赛
5	使用现代工具：能够针对生物科学专业问题，选择与使用合适的现代技术工具。	① 课堂教学 ：生物信息学、R 语言与生物统计、Python 语言课程设计、多组学与大数据处理等 ② 课外学习 ：服务器命令的学习、数据的收集与分析

序号	毕业要求	实现途径（教学过程）
6	专业与社会：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。	① 课堂教学 ：生态学概论、地球科学概论、环境地球科学导论、系统科学概论等 ② 课外学习 ：实习实践、毕业设计
7	职业规范：具有生物科学专业应具有的职业道德和规范。	① 课堂教学 ：思想道德与法治、实验守则、野外实习要求 ② 课外学习 ：野外实习实践、毕业实习、毕业设计
8	个人和团队：正确理解个人与团队的关系。	① 课堂教学 ：课程分组讨论与汇报、课程实验、野外实习 ② 课外学习 ：社团工作、实习实验、实践锻炼、毕业设计
9	管理与沟通：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。	① 课堂教学 ：文献阅读与讲解、课程论文写作、创新创业课程等 ② 课外学习 ：文献翻译、科技论文报告会、参加学术讲座、社会调查
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。	① 课堂教学 ：通识选修课、专业选修课、就业指导等 ② 课外学习 ：毕业实习、创新创业项目、毕业设计

毕业要求与培养目标的对应关系矩阵

培养目标 毕业要求	目标 1	目标 2	目标 3	目标 4	目标 5
毕业要求 1		√			
毕业要求 2	√		√	√	√
毕业要求 3	√	√	√	√	√
毕业要求 4	√	√	√	√	√
毕业要求 5		√	√	√	
毕业要求 6	√	√	√	√	
毕业要求 7	√	√			
毕业要求 8	√	√		√	√
毕业要求 9	√	√	√		√
毕业要求 10	√	√	√	√	√

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、植物生态学。

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：

地质与环境认识实习、植物学现场教学、Python 语言课程设计、植物学野外实习、生态学野外实习、毕业实习、毕业设计。

毕业学分要求：

不少于 170 学分。

学制与学位：

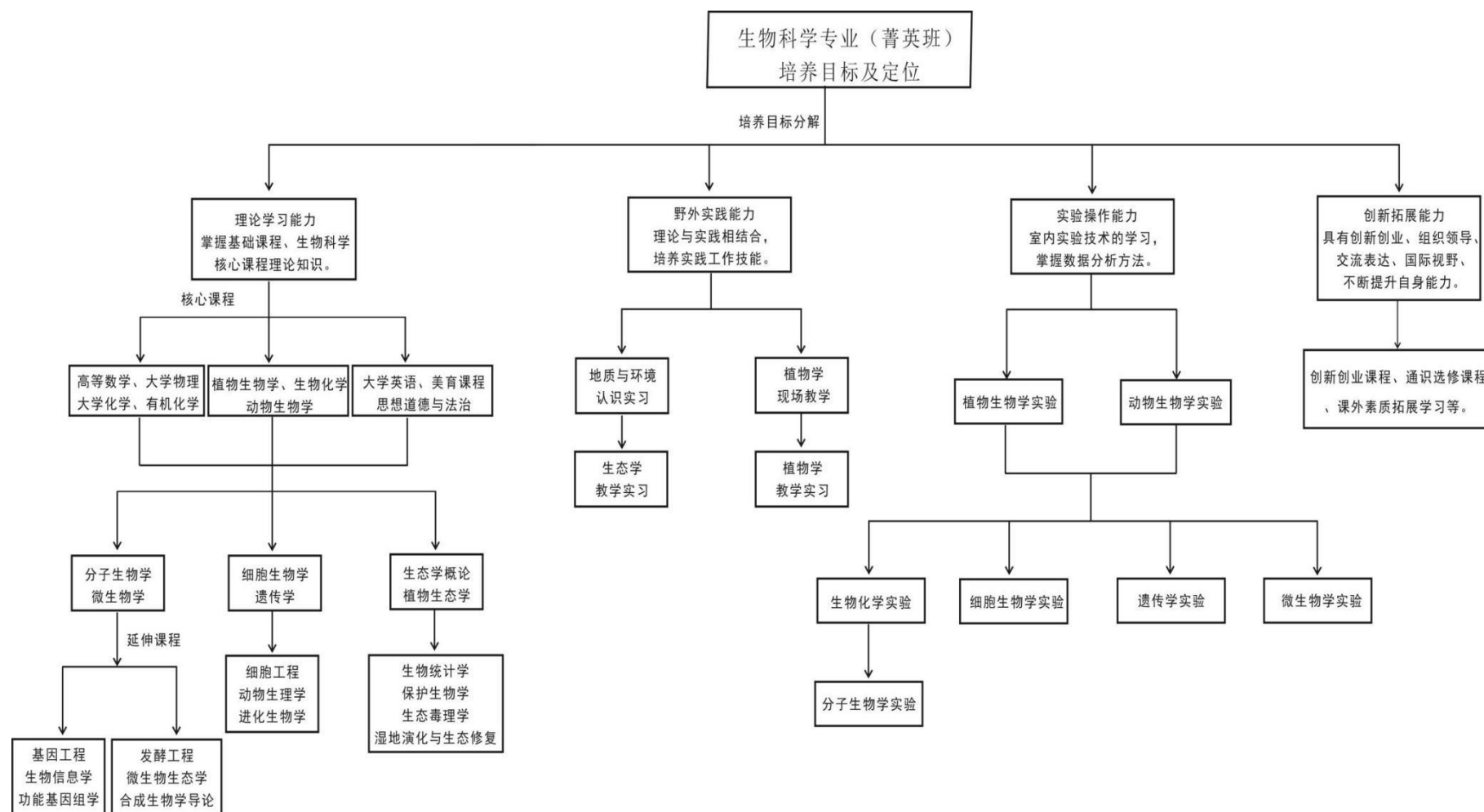
学制四年，授予理学学士学位。

本专业学生可以辅修的其他专业：

环境工程、应用化学。

相近专业：

生物技术、生态学。



Program for Bioscience

Specialty and Code: Bioscience, 071001

Education Objectives :

The major is dedicated to educating young talents in the new era who have been edified by the socialist core value system, are capable of serving the society and are dedicated to their jobs, so that they can develop morally, intellectually, physically, aesthetically and industrially in an all-round way, and have a good sense of social responsibility and moral cultivation. Cultivate solid basic theoretical knowledge of biological science and environmental geosciences, as well as solid experimental skills and strong innovative thinking. Have the basic knowledge of computer software and hardware, master the programming technology of more than one computer language, and be able to skillfully process computer words, graphics, data, etc. and apply them to the research of biological science and technology. Master a foreign language, have the ability to listen, speak, read, write and conduct international academic exchanges, and achieve the level of independent access to information. Having good scientific quality, strong innovation ability and team spirit, being able to adapt to the needs of biological science development and technological progress, and having good knowledge and quality of humanities and social sciences and management science, becoming a high-quality innovative talent with profound expertise, knowledge and practice, and can engage in education and teaching, scientific research, science and technology management, popular science creation and other work in the field of biology.

The training objectives can be broken down into the following five sub-objectives:

Goal 1: Young talents of the new era who possess noble professional ethics and a high sense of social responsibility, understand the laws, regulations, and rules of the country and related industries in biology, and are dedicated and willing to contribute.

Goal 2: Have a good scientific literacy in natural science and humanities, and have an applied foundation in mathematics, physics, chemistry, computers, foreign languages and management.

Goal 3: Possess solid theoretical knowledge in biological sciences, be able to master professional experimental skills, have strong innovative thinking, and be able to conduct biological research and practice.

Goal 4: Possess rich theoretical and practical experience in multiple disciplines such as life sciences, environmental sciences, earth sciences, and computer science, and have the ability to analyze and solve production and life related problems in related fields.

Goal 5: Have good expression and communication skills, and be able to engage in

education and teaching, scientific research, technology management, popular science creation, and other work.

Graduation Requirements:

1.Basic knowledge: Master the basic theory and knowledge on the mathematics, physics, chemistry, english and biology.

2.Problem analysis: Master the theoretical and practical work skills of biological science, and have the basic ability to engage in basic theoretical research, applied research, analytical experiments, data processing and other work in molecular biology, ecology and environmental geosciences; Be able to use these technologies, methods and abilities to identify, express, and analyze the professional problems of related disciplines through literature study to obtain effective conclusions.

3.Design/Develop Solutions: Ability to design/develop solutions to professional problems in biological science, embody innovation awareness in design, monitoring and management, and consider social, health, safety, legal, cultural and environmental factors.

4.Researchs: Be able to study relevant issues based on the principles, techniques and methods mastered by the biological science specialty, and obtain reasonable and effective conclusions through information synthesis, discussion and analysis.

5.Apply the modern tools: Be able to select and use modern technical tools such as bioinformatics, R language, Python language, etc. to analyze, predict and simulate problems and understand their limitations.

6.Speciality and Society: Ability to make reasonable analysis based on the relevant background knowledge of biological science, evaluate the impact of problem solutions on society, environment, health, safety, law, culture and sustainable development, and understand the responsibilities to be undertaken.

7.Occupational norms: Understand and fulfill occupational norms and ethics related to biological science.

8.Individual and team: Should have a strong sense of teamwork, be able to write reports and design drafts, make statements, and express clearly, and ability to play the role of individuals, team members, and leaders in a multidisciplinary team.

9.Management and communication: Understand and master relevant management and decision- making methods, be able to effectively communicate and exchange with peers in the industry and the public on biological science professional issues, have a certain international perspective, and be able to communicate and exchange in a cross- cultural context.

10.Lifelong learning: Have the awareness of independent learning and lifelong learning, have the ability to continuously learn and adapt to development, and be able to continuously learn based on the needs of career development and adapt to career development.

Graduation Requirements and Pathways :

No.	Graduation Requirements	Pathways (Teaching Process)
1	Basic knowledge: Master the basic theory and knowledge on mathematics, physics, chemistry, english.	① Classroom Teaching : Advanced Mathematics, University Physics, University Chemistry, Analytical Chemistry, Organic Chemistry, College English, etc. ② Extracurricular Learning: Extracurricular exercise, Practice
2	Problem analysis: master the theory and practical work skills of biological science; Be able to use technology and methods, and analyze discipline and professional problems through literature study.	① Classroom Teaching: Plant Biology, Animal Biology, Microbiology, Biochemistry, etc. ② Extracurricular Learning: Extracurricular exercise, Practice, Literature reading
3	Design/develop solutions: Be able to design/develop solutions to professional problems in biological science, and show innovation awareness.	① Classroom Teaching : Molecular Biology, Gene Engineering, Plant Ecology, Microbial Ecology, etc. ② Extracurricular Learning: Extracurricular exercise, Practice, Graduation practice, Graduation design
4	Researchs: Be able to study relevant issues based on the principles, technologies and methods mastered by the biological science specialty.	① Classroom Teaching : Botanical Experiments, Zoological Experiments, Microbiological Experiments, Biochemical Experiments, Genetics Experiments, Molecular Biology Experiments, Botanical Field Practice, etc. ② Extracurricular Learning : Student scientific research project initiation, scientific and technological paper report meeting, biological experiment skill contest
5	Apply the modern tools: Capable of selecting and using appropriate modern technology tools for biological science professional problems.	① Classroom Teaching : Bioinformatics, R Language and Biostatistics, Course Design for Python Language, Multi-omics and Big Data Processing, etc. ② Extracurricular Learning: Server command learning, data collection and analysis
6	Speciality and Society: Based on the relevant background knowledge of biological science, make reasonable analysis and evaluate the impact of problem solutions on	① Classroom Teaching : Introduction to Ecology, Introduction to Earth Sciences, Introduction to Environmental Earth Sciences, Introduction to System Science, etc. ② Extracurricular Learning : Practice,

No.	Graduation Requirements	Pathways (Teaching Process)
	society, environment, health, safety, law, culture and sustainable development.	Graduation design
7	Occupational norms: professional ethics and norms for the major of biological sciences	① Classroom Teaching : Morality Education and Rule of Law, Experiment Rules, Field Practice Requirements ② Extracurricular Learning : Field practice, Graduation practice, Graduation design
8	Individual and team: Correctly understand the relationship between individual and team.	① Classroom Teaching: Group Discussion and Report, Curriculum Experiment, Field Practice ② Extracurricular Learning : Community work, Internship experiment, Practical exercise, Graduation design
9	Management and communication: Be capable to effectively communicate in the industry and the public on professional issues of biological science.	① Classroom Teaching: Literature Reading and Explanation, Course Paper Writing, Innovation and Entrepreneurship Courses, etc. ② Extracurricular Learning : Literature translation, Scientific and technological paper report, Academic lectures, Social surveys
10	Lifelong learning: with the awareness of self-learning and lifelong learning, and the ability to constantly learn and adapt to development.	① Classroom Teaching : General Elective Course, Specialty Elective Courses, Employment Guidance, etc. ② Extracurricular Learning : Graduation practice, Innovation and entrepreneurship projects, Graduation design

Correspondence matrix between graduation requirements and training objectives:

training objectives graduation requirements	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
graduation requirements 1		√			
graduation requirements 2	√		√	√	√
graduation requirements 3	√	√	√	√	√
graduation requirements 4	√	√	√	√	√
graduation requirements 5		√	√	√	
graduation requirements 6	√	√	√	√	
graduation requirements 7	√	√			
graduation requirements 8	√	√		√	√
graduation requirements 9	√	√	√		√
graduation requirements 10	√	√	√	√	√

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, Experiments of Molecular Biology.

Practical Work:

Field Practice in Botany, Field Practice in Ecology, Geological and Environmental Cognition Practice, Botanical Field Practice, Course Design for Python Language, Graduation Practice and Design.

Required Credits for Graduation:

170 credits.

Duration& Degree Granted:

Four years, Bachelor of Science degree.

Recommended Minors:

Environmental Engineering, Applied Chemistry.

Related Specialties:

Biotechnology, Ecology.

生物科学专业课程教学计划表

Course Descriptions of Bioscience

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 Courses	必修 Compulsory	12007800	马克思主义基本原理 Principles of Marxism	3	48	48						3							
		12008100	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	2	32	32								2					
		12008000	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	3	48	48								3					
		11711800	中国近现代史纲要 The Essentials of Modern Chinese History	2	32	32							2						
		12007900	思想道德与法治 Ideological morality and rule of law	3	48	48						3							
		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					
		14300300	军事理论 Military Theory	2	32	32						2							
		12008200	劳动教育 Labor Education	1	16	16						1							
	选修 Elective	包括美育、心理健康教育课程（不少于2学分）总计12学分，跨学科选修课不低于4学分		12	192	192													
		小计 Sum		43	768	768	0	0	0	48	0	13	6	9	1	0	0	0	0
大类专业平台课 Platform Courses	20441300	地球系统科学概论（含大类导论） Introduction to Environmental Earth Sciences	1.5	24	24				8			1.5							
	20441400	微生物学基础 Foundations in Microbiology	1	16	16				8				1						
	212127*2	高等数学B Advanced Mathematics B	10	160	160							4	6						

课程 类别 Classi- fication	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 Prerequis- ite 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									
	21212 802	线性代数 B Linear Algebra B	2.5	40	40								2.5					
	21213 0*3	大学物理 C College Physics C	6	96	96							3.5	2.5					
	21220 802	物理实验 B Physical Experiments B	1	32	4	28						1						
	20326 903	大学化学 C College Chemistry C	3	48	48						3							
	20327 003	大学化学实验 C College Chemistry Experiment C	1	24		24					1							
	21947 400	Python 语言程序设计 Python Language Programming	2.5	40	40		16					2.5						
	20119 600	普通地质学 Physical Geology	2.5	40	40		8				2.5							
	21130 401	测量学 A Surveying A	2	32	32		16					2						
	小计 Sum		33	552	500	52	40	16	0	0	12	16	5	0	0	0	0	0
	学科基础课 Disciplinary Fundamental Courses	21213 502	概率论与数理统计 B Probability and Statistics B	2.5	40	40								2.5				
20327 302		有机化学 B Organic Chemistry B	2.5	40	40								2.5					
20327 402		有机化学实验 B Organic Chemistry Experiment B	1	16		16							1					
20327 102		分析化学 B Analytical Chemistry B	1.5	24	24								1.5					
20327 202		分析化学实验 B Analytical Chemistry Experiment B	1	16		16							1					
20124 100		矿物岩石学 Mineralogy and Lithology	2	32	10	22	16					2						
20123 402		构造地质学 B Structure Geology B	2	32	32		16						2					
小计 Sum			12.5	200	146	54	32	0	0	0	0	2	2	8.5	0	0	0	0
专业主干课 Main Specialty Courses	20431 400	动物生物学 Animal Biology	3	48	48								3					
	20443 600	植物生物学 Plant Biology	3	48	48			8					3					
	20443 700	生物化学 Biochemistry	4	64	64			8					4					
	20419 900	细胞生物学 Cell Biology	3	48	48									3				
	20443 800	微生物学 Microbiology	2	32	32										2			

课程 类别 Classi- fication	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 Prerequis- ite 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									
	20420100	遗传学 Genetics	3	48	48									3				
	20436500	植物生态学 Plant ecology	1.5	24	24								1.5					
	20443900	分子生物学 Molecular Biology	3	48	48			8							3			
	20444000	生物信息学 Bioinformatics	2	32	32		8								2			
	20444100	生物统计学 Biostatistics	2	32	32		8							2				
	小计 Sum		26.5	424	424	0	16	24	0	0	0	0	0	11.5	8	7	0	0
Specialty Courses	专业选修课	可按方向设课，具体见专业选修课列表	14	224	224													
合计 Sub-total			129	2168	2062	106	88	40	48	0	25	24	16	21	8	7	0	0
Practical Work	44300400	军事训练 Military Training	2	2 周							2							
	42008300	劳动实践 Labor practice	1	1 周											1			
	41947500	Python 语言课程设计 A Course Design for Python Language A	1.5	1.5 周								1.5						
	41120901	测量教学实习 A Surveying Practice A	1	1 周								1						
	40438800	地质与环境认识实习（北戴河） Primary Field Training (Beidaihe)	3	3 周								3						
	40432700	动物生物学实验 Experiments of Animal Biology	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			
	40445200	微生物学实验 Experiments of Microbiology	1	24		24										1		
	40433200	遗传学实验 Experiments of Genetics	1	24		24									1			
	40444200	分子生物学实验 Experiments of Molecular Biology	1	24		24										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										
	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					
	40437400	毕业实习 Graduation Practice	6	6 周													6		
	40421700	毕业设计 Graduation Design	8	8 周														8	
	小计 Sum		36	27.5 周 +204	0	204	0	0	0	0	2	5.5	0	9.5	2	3	6	8	
创新创业自主学习 Freedom study	ZZ35000S	社会调查 Social Investigation	2												2				
		其他(含创新创业课程、学科竞赛、发明创造、科研报告) Others (Start-up, Contest, Invention, Innovation and Research Presentation)	3																
	小计 Sum		5												2				
总计 Total			170	2372+ 27.5 周	2062	310	88	40	48	0	27	29.5	16	30.5	10	10	6	8	
可开出专业选修课列表 Specialty Elective Courses	模块 1（至少选 4.5 学分）																		
	20400100	保护生物学 Conservation Biology	2	32	32												2		
	20445300	医学地质学 Medical Geology	2	32	32												2		
	20433600	应用藻类学 Applied Phycology	1.5	24	24										1.5				
	20444300	生物地球化学 Biogeochemistry	1.5	24	24										1.5				
	20444400	地球生物学概论 Introduction to Geobiology	1.5	24	24													1.5	
	20408000	湿地生态学 Wetland Ecology	1.5	24	24													1.5	
	20444500	生态毒理学 Ecotoxicology	1.5	24	24												1.5		
	20444600	湿地演化与生态修复 Wetland Evolution and Ecological Restoration	1.5	24	24										1.5				
	20439800	碳中和技术概论 Introduction to Carbon Neutralization Technology	1.5	24	24													1.5	
	模块 2（至少选 5.5 学分）																		

课程 类别 Classi- fication	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 Prerequis- ite 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									
	20411400	细胞工程 Cell Engineering	2	32	32										2			
	20433800	动物生理学 Animal Physiology	2	32	24	8								2				
	20406300	基因工程 Genetic Engineering	2	32	32										2			
	20406400	进化生物学 Evolutionary Biology	2	32	32											2		
	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			
	20444700	环境生物技术 Environmental Biotechnology	1.5	24	24											1.5		
	20444800	生物安全理论与法规 Biosafety Theory and Regulations	1	16	16											1		
模块 3（至少选 4 学分）																		
	20434100	系统生物学基础 Foundations of Systems Biology	1.5	24	24											1.5		
	20434300	合成生物学导论 Introduction to Synthetic Biology	1.5	24	24										1.5			
	20434500	发酵工程 Fermentation Engineering	2	32	24	8										2		
	20411100	微生物生态学 Microbial Ecology	2	32	32									2				
	20444900	生命科学前沿 Frontier of life science	1.5	24	24											1.5		
	20445000	病毒学 Virology	1.5	24	24											1.5		
	20445100	微生物与地质工程应用 Microbiology and Geoengineering Applications	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。

生物科学专业课程分类统计

Course Classifications and Statistics of Bioscience

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 Hours	学分总计 Total Credits
	必修	选修							
课内总学时/学分	576/31	192/12	752/45.5	424/26.5	224/14	27.5 周 +204/36	5	2372 +27.5 周	170
学分所占比例	25.3%		26.8%	15.6%	8.2%	21.2%	2.9%	100%	100%

生物科学辅修专业培养计划

一、培养目标

熟悉并掌握生物科学专业相关的基本理论、基本知识和基础的实验技能；拓展学生的知识面，为学科之间的交叉创新奠定基础。

二、学分要求

完成学业的学分要求：24 学分。

其中：学科基础课：9 学分；专业主干课：13 学分；实践环节：2 学分。

修够 24 学分者，由学校审核后发放辅修专业毕业证书；若未能修够 24 学分，则不予发放任何辅修专业证书。

三、教学进程计划表

生物科学辅修专业课程教学计划表
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 Disciplinary Courses	20443600	植物生物学 Plant Biology	3	48	48		8							3			
	20431400	动物生物学 Animal Biology	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	20443700	生物化学 Biochemistry	4	64	64		8								4		
	20420100	遗传学 Genetics	3	48	48											3	
	20443900	分子生物学 Molecular Biology	3	48	48		8										3
	20419900	细胞生物学 Cell Biology	3	48	48											3	
	小计 Sum		13	208	208		24								4	6	3
实践环节 Practical Work	40431600	综合实验 Comprehensive Experiment	2	32		32											2
	小计 Sum		2	32		32											2
总计 Total			24	384	352	32	24							6	7	6	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	208/13	32/2	384	24
学分所占比例	37.5%	54.2%	8.4%		100%