

数学与应用数学专业培养方案

Undergraduate Program in Mathematics and Applied Mathematics

一、专业简介 (Major Introduction)

数学与应用数学专业（专业代码：070101）是教育部设立的数学类应用理科本科专业，学制四年，授予理学学士学位。本专业培养掌握数学科学基本理论与方法，接受科学研究基本训练，具备运用数学知识和计算机技术解决实际问题能力的高级专门人才。主干学科为数学，核心课程包括数学分析、高等代数、空间解析几何、常微分方程、概率论、数理统计、数学建模、实变函数、复变函数、泛函分析、偏微分方程、数值分析等。毕业生可在科技、教育、经济、金融等部门从事研究、教学、应用开发及管理工作，具有扎实数学基础、良好创新意识和较强实践能力。

The major of Mathematics and Applied Mathematics (Major Code: 070101) is an undergraduate applied science program in the field of mathematics established by the Ministry of Education, with a four-year academic duration and confers a Bachelor's degree in Science. This program aims to cultivate advanced professionals who master the fundamental theories and methods of mathematical science, receive basic training in scientific research, and possess the ability to apply mathematical knowledge and computer technology to solve practical problems. The core discipline is mathematics, with key courses including Mathematical Analysis, Advanced Algebra, Spatial Analytic Geometry, Ordinary Differential Equations, Probability Theory, Mathematical Statistics, Mathematical Modeling, Real Analysis, Complex Analysis, Functional Analysis, Partial Differential Equations, and Numerical Analysis. Graduates can pursue careers in research, teaching, application development, and management in fields such as technology, education, economics, and finance, demonstrating a solid mathematical foundation, strong innovative awareness, and robust practical capabilities.

二、专业培养目标 (Academic Objectives)

本专业面向科技、教育、经济、金融等行业对数学人才的需求，围绕创新型国家建设和区域发展需要，培养德、智、体、美、劳全面发展，适应现代数学与应用数学发展需要，掌握数学科学的基本理论和基本方法，具备运用数学知识和计算机技术解决实际问题以及初步科学研究的能力，具有良好的科学文化素养、创新精神和团队协作精神，毕业后可在科技、教育、经济、金融等部门从事研究、教学、应用开发和管理工作的数学与应用数学方面的高级人才。经过5年的实际工作，能够承担科研、教学或技术管理等工作，胜任本领域的业务骨干或项目负责人岗位。

This major is aimed at meeting the demand for mathematical talents in industries such as technology, education, economy, and finance. It focuses on the needs of building an innovative country and regional development, cultivating comprehensive development in morality, intelligence, physical fitness, aesthetics, and labor, adapting to the development needs of modern mathematics and applied mathematics, mastering the basic theories and methods of mathematical science, possessing the ability to apply mathematical knowledge and computer technology to solve practical problems and conduct preliminary scientific research, and having

good scientific and cultural literacy, innovative spirit, and teamwork spirit. After graduation, it can work as a senior talent in mathematics and applied mathematics in research, teaching, application development, and management in departments such as technology, education, economy, and finance. After 5 years of practical work, students are capable of undertaking scientific research, teaching, or technical management work, and am competent for the position of business backbone or project leader in this field.

三、毕业要求（Academic Requirement）

本专业学生主要学习数学与应用数学的基础理论、基本方法，接受数学模型、计算机和数学软件方面的基本训练，在数学理论和应用两方面受到良好教育，注重思想明德培育，融入思政教育元素，培养具有较高科学素养、较强创新意识和正确价值导向的复合型数学人才。毕业生应获得以下知识和能力：

（1）具有良好的思想品德、社会公德、职业道德和法治素养，能够自觉认同并积极践行社会主义核心价值观，树立坚定理想信念与深厚家国情怀，恪守学术诚信与科研道德，具备责任担当、团队协作意识与人文素养，成长为德才兼备、全面发展的高素质人才。

（2）具有较扎实的数学基础，接受系统的数学思维训练，掌握数学科学的思想方法，将个人专业发展融入国家发展和社会需求。

（3）具备数学研究或运用数学知识解决实际问题的初步能力，秉持科学精神、严谨态度，在实践中践行思想明德要求，做到求真务实、精益求精，主动运用数学知识服务社会、奉献社会。

（4）了解数学的历史概况和广泛运用，以及当代数学的某些新发展和应用前景，传承数学学科中的科学精神和人文内涵，增强文化自信，树立正确的历史观、价值观，强化思想明德修养。

（5）能熟练使用计算机（包括常用语言、工具及数学软件），具有编写简单程序的能力，自觉遵守网络道德和信息安全规范，在技术应用中坚守思想底线，做到诚信自律、依法用网。

（6）具有较强的语言表达能力，掌握资料查询、文献检索以及运用现代技术获取相关信息的基本方法，并掌握一门外语，注重沟通中的文明素养，践行思想明德要求，做到尊重他人、团结协作，具备良好的职业素养和人文情怀。

（7）具备体育运动的一般知识，达到国家规定的大学生体育锻炼合格标准，具有健康的体魄和良好的心理素质，培养坚韧不拔的意志品质、积极乐观的人生态度，践行身心健康、明德向善的成长理念，做德智体美劳全面发展的合格毕业生。

Students in this major primarily study the fundamental theories and basic methods of mathematics and applied mathematics, receiving foundational training in mathematical modeling, computers, and mathematical software. They are well-educated in both theoretical and applied mathematics, with an emphasis on cultivating moral integrity and integrating ideological and political education elements. The goal is to develop versatile mathematical talents with high scientific literacy, strong innovative awareness, and correct value orientation. Graduates should acquire the following knowledge and competencies:

(1) Possess good ideological and moral character, social ethics, professional ethics, and legal awareness; consciously identify with and actively practice the core socialist values, uphold firm ideals and beliefs as well as deep patriotic sentiment, adhere to academic integrity and research ethics, demonstrate a sense of responsibility, teamwork, and humanistic qualities, and grow into a high-quality talent who is both virtuous and capable, achieving all-round development.

(2) Possess a solid foundation in mathematics, undergo systematic training in mathematical thinking, master the methodologies of mathematical science, and integrate personal professional development with national progress and societal needs.

(3) Possess the preliminary ability to conduct mathematical research or solve practical problems, uphold a scientific spirit and rigorous attitude, practice the requirements of intellectual virtue in practice, pursue truth and pragmatism with meticulousness, and actively apply mathematical knowledge to serve and contribute to society.

(4) Gain an overview of the history and extensive applications of mathematics, as well as certain new developments and future prospects in contemporary mathematics. Inherit the scientific spirit and humanistic connotations within the discipline of mathematics, strengthen cultural confidence, establish a correct historical and value perspective, and enhance moral cultivation in thought.

(5) Proficient in using computers (including common languages, tools, and mathematical software), capable of writing simple programs, consciously adhering to online ethics and information security standards, maintaining ideological integrity in technical applications, and practicing honesty, self-discipline, and lawful internet usage.

(6) Possess strong language proficiency, master the fundamental methods of information retrieval, literature search, and utilizing modern technology to obtain relevant data, and acquire a foreign language. Emphasize cultural literacy in communication, practice the principles of moral integrity, demonstrate respect for others, foster teamwork, and uphold professional ethics and humanistic values.

(7) Possess general knowledge of sports, meet the national standard for physical fitness among college students, maintain a healthy physique and sound psychological qualities, cultivate perseverance, a positive and optimistic attitude toward life, practice the growth philosophy of physical and mental well-being and moral integrity, and become a well-rounded graduate with balanced development in morality, intelligence, physique, aesthetics, and labor.

四、主干学科（Main disciplines）

数学。

Mathematics.

五、学制与学位（Length of Schooling and Degree）

学制四年。学生修满规定的最低毕业总学分（160 学分），达到毕业要求后，授予理学学士学位。

The academic program lasts for four years. After completing the minimum graduation credits (160 credits) and meeting the graduation requirements, students will be awarded a Bachelor of Science degree.

六、核心课程（Core Courses）

学科基础课： 数学分析、高等代数与解析几何、数学与应用数学专业导论、大学物理。

专业核心课：常微分方程、近世代数、实变函数、复变函数、概率论、数学建模、泛函分析、数理统计、数值分析、偏微分方程。

专业拓展课：拓扑学、组合数学、矩阵论、多元统计分析、时间序列分析、案例实务选讲、数学与应用数学前沿课、偏微分方程数值解、金融数学、常微分方程定性理论、运筹与优化、微分几何、深时大数据与地球演化。

课程实践：Python 科学计算及应用、AI 算法实践、统计分析软件、数学专业综合实训、毕业设计（论文）等。

Basic Disciplinary Courses: Mathematical Analysis, Advanced Algebra and Analytical Geometry, Introduction to Mathematics and Applied Mathematics.

Core Professional Courses: Ordinary Differential Equations, Modern Algebra, Real Analysis, Complex Analysis, Probability Theory, Mathematical Modeling, Functional Analysis, Mathematical Statistics, Numerical Analysis, Partial Differential Equations.

Professional Elective Courses: Topology, Combinatorial Mathematics, Matrix Theory, Multivariate Statistical Analysis, Time Series Analysis, Selected Cases, Frontiers in Mathematics and Applied Mathematics, Numerical Solutions of Partial Differential Equations, Financial Mathematics, Qualitative Theory of Ordinary Differential Equations, Operations Research and Optimization, Differential Geometry, Deep Time Big Data and Earth Evolution.

Course Practice: Python for Scientific Computing and Applications, AI Algorithm Practice, Statistical Analysis Software, Professional Comprehensive Training, Graduation Project (Thesis), etc.

七、最低毕业总学分要求及学分分配 (Minimum Required Credits and Distribution)

课程模块 Course Module	课程类别 Course Classification	学时数 Hours	学分 Credits	学 期 Semester											
				1	2	1 夏	3	4	2 夏	5	6	3 夏	7	8	
通识教育 Liberal Education	通识教育必修课程 Required Courses of General Education	746	42	13.25	14.25		4.25	4.25		3.25	1.25	1	0.25	0.25	
	通识教育选修课程 Selective Courses of General Education	160	10												
专业教育 Professional Education	学科基础课程 Disciplinary Fundamental Courses	528	33	12	13		8								
	专业核心课程 Specialized Core Courses	496	31				6	13		12					
	专业拓展课程 Specialized Development Courses	240	15					6			16		17		
实践教育 Practical Education	课程实践 Course Practice	18 周+72 学时	24	2		6			4		2	4		6	
	课外实践 Extracurricular Practice	96	6												
必修课总学分 Required Course Credits				130											
选修课总学分 Elective Course Credits				31											
最低毕业总学分 Total Credits				161											

八、课程设置 (Curriculum)

1、通识教育必修课程(Required Courses of General Education): 746 学时(746 Hours), 42 学分(42 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR041002	计算机语言程序设计 Computer Language Programming	64	4	32	32		考试 Exam	2	
GR041011	人工智能概论 Introduction of Artificial Intelligence	32	2	16	16		考试 Exam	1	
GR081067	大学英语素质拓展课 Competence-oriented Education for College English	32	2				考试 Exam	2	
GR081071	大学英语(1) College English(1)	64	4	64			考试 Exam	1	
GR081072	大学英语(2) College English(2)	32	2				考试 Exam	2	
GR141005	体育(1)(系列课程) Physical Education(1)	32	1				考试 Exam	1	
GR141006	体育(2)(系列课程) Physical Education(2)	32	1				考试 Exam	2	
GR142007	体育(3)(系列课程) Physical Education(3)	32	1				考试 Exam	3	
GR142008	体育(4)(系列课程) Physical Education(4)	32	1				考试 Exam	4	
GR181008	中国近现代史纲要 Essentials of Modern Chinese History	48	3	48			考试 Exam	2	
GR181009	思想道德与法治 Ideological morality and rule of law	48	3				考试 Exam	1	
GR181013	形势与政策(1) Situation and Policy Education(1)	4	0.25	4			考查 Term Paper	1	
GR181014	形势与政策(2) Situation and Policy(2)	4	0.25				考查 Term Paper	2	

GR181015	形势与政策(3) Situation and Policy(3)	4	0.25				考查 Term Paper	3	
GR181016	形势与政策(4) Situation and Policy(4)	4	0.25				考查 Term Paper	4	
GR181017	形势与政策(5) Situation and Policy(5)	4	0.25				考查 Term Paper	5	
GR181018	形势与政策(6) Situation and Policy(6)	4	0.25				考查 Term Paper	6	
GR181019	形势与政策(7) Situation and Policy(7)	4	0.25				考查 Term Paper	7	
GR181020	形势与政策(8) Situation and Policy(8)	4	0.25				考查 Term Paper	8	
GR182014	马克思主义基本原理 The Fundamental Principles of Marxism	48	3				考试 Exam	3	
GR182022	习近平新时代中国特色社会主义思想概论 An Introduction to Xi Jinping Thought on Socialism with Chinese	48	3				考试 Exam	5	
GR182024	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thoughts and Theoretical System of the Chinese Characteristic Socialism	32	2	32			考试 Exam	4	
GR301004	大学生职业生涯规划与就业指导(1) Career Planning and Employment Guidance for University Students(1)	20	1	16	4		考试 Exam	2	
GR301005	大学生心理素质教育(1) Mental Health(1)	16	1	16			考查 Term Paper	1	
GR301024	劳动教育与双创实践(1) Labor Education and Innovation and Entrepreneurship Practice(1)	16	1	16			考查 Term Paper	2	
GR303005	大学生职业生涯规划与就业指导(2) Career Planning and Employment Guidance for University Students(2)	18	1	12	6		考试 Exam	6	

GR303006	大学生心理素质教育(2) Mental Health(2)	16	1	16			考查 Term Paper	4	
GR303025	劳动教育与双创实践(2) Labor Education and Innovation and Entrepreneurship Practice(2)	16	1		16		考查 Term Paper	3 夏	
GR311601	军事理论 Military Theory	36	2	36			考试 Exam	1	
总计 Total		746	42	308	74				

2、通识教育选修 (Selective Courses of General Education): 160 学时 (160 Hours), 10 学分 (10 Credits)

序号 No.	课程类别 Courses Classification	课程名称 Courses Name	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
1	人文社科类 (含在线课程) Humanities and Social Sciences Courses (Inc. Online Courses)	见附件 1	6	考查 Term paper	2-8	5 个类别中选修 6 个学分, 其中国家安全教育 1 学分、新生研讨 课 1 学分均为必选, 其他合计 4 学分。
2	自然科学类 (含在线课程) Natural Science Courses (Inc. Online Courses)	见附件 2		考查 Term paper	2-8	
3	生态文明类 (自然文化、碳中和) Ecological Civilization Courses (Natural Culture、 Carbon-Neutral)	见附件 3		考查 Term paper	2-8	

4	体育与健康类 Sports and Health Courses	见附件 4		考查 Term paper	2-8	
5	新生研讨课程 Freshman Seminar	见附件 5		考查 Term paper	1-2	
6	创新创业教育类（含在线课程） Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 6	2	考查 Term paper	2-8	
7	审美与艺术类 Aesthetics and Art Courses	见附件 7	2	考查 Term paper	2-8	
总计 Total			10			

3、学科基础课程(Disciplinary Fundamental Courses)：528 学时(528 Hours)，33 学分(33 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR190038	数学与应用数学专业导论 Introduction of Mathematics and Applied Mathematics	16	1				考查 Term Paper	1	
DR191019	数学分析(1) Mathematical Analysis(1)	96	6	96			考试 Exam	1	
DR191608	大学物理 B(1) College PhysicsB(1)	48	3	48			考试 Exam	2	
DR191614	高等代数与解析几何(1) Advanced Algebra and Analytic Geometry(1)	80	5	80			考试 Exam	1	

DR191615	高等代数与解析几何(2) Advanced Algebra and Analytic Geometry(2)	80	5	80			考试 Exam	2	
DR191616	数学分析(2) Mathematical Analysis (2)	80	5				考试 Exam	2	
DR192609	大学物理 B(2) College PhysicsB(2)	48	3	48			考试 Exam	3	
DR192617	数学分析(3) Mathematical Analysis (3)	80	5				考试 Exam	3	
总计 Total		528	33	352					

4、专业核心课程(Specialized Core Courses)：496 学时(496 Hours)，31 学分(31 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR192025	概率论 Probability Theory	48	3	48			考试 Exam	4	
DR192026	实变函数 Real Variable Functions	48	3	48			考试 Exam	4	
DR193028	泛函分析 Functional Analysis	48	3	48			考试 Exam	5	
DR194029	近世代数 Abstract Algebra	48	3	48			考试 Exam	3	
SR192031	常微分方程 Ordinary Differential Equations	48	3	48			考试 Exam	3	
SR192032	数学建模 Mathematics Modeling	64	4	52	12		考查 Term Paper	4	
SR192103	复变函数 Complex Variable Functions	48	3				考试 Exam	4	
SR193033	数理统计 Mathematical Statistics	48	3	48			考试 Exam	5	

SR193104	数值分析 Numerical Analysis	48	3				考试 Exam	5	
SR193105	偏微分方程 Partial Differential Equations	48	3	48			考试 Exam	5	
总计 Total		496	31	388	12				

5、专业拓展课程(Specialized Development Courses)：240 学时(240 Hours)，15 学分(15 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SR192100	拓扑学 Topology	48	3	48			考试 Exam	4	
SR192618	运筹与优化 Operations Research and Optimization	48	3				考试 Exam	4	
SR193035	偏微分方程数值解 Numerical Solution of Partial Differential Equations	48	3	48			考试 Exam	6	
SR193036	组合数学 Combinatorial Mathematics	64	4	64			考试 Exam	6	
SR193037	金融数学 Financial Mathematics	48	3	48			考试 Exam	7	
SR193106	微分几何 Differential Geometry	48	3				考试 Exam	6	
SR193108	多元统计分析 Multivariate Statistical Analysis	48	3				考试 Exam	6	
SR194109	时间序列分析 Time Series Analysis	48	3				考试 Exam	7	
SR194110	案例实务选讲 Selected Cases	32	2				考查 Term Paper	7	
SS014104	深时大数据与地球演化 Deep-time Big-data and Earth's	32	2				考查 Term Paper	7	

	Evolution								
SS193107	矩阵论 Matrix Theory	48	3				考试 Exam	6	
SS194111	数学与应用数学前沿课 Frontier Courses of Mathematics and Applied Mathematics	16	1				考查 Term Paper	7	
SS194120	机器学习 Machine Learning	48	3				考查 Term Paper	7	
SS194620	常微分方程定性理论 Qualitative Theory of Ordinary Differential Equations	48	3				考查 Term Paper	7	
总计 Total		240	15	208					

6、课程实践(Course Practice)：18 周+72 学时(18 weeks and 72 Hours)，24 学分(24 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
PR181010	思想政治社会实践 Political Social Practice	32	2		32		考查 Term Paper	1 夏	
PR191624	Python 科学计算及应用 Python Scientific Computing and Applications	4	4				考查 Term Paper	1 夏	
PR192625	AI 算法实践 AI Algorithm Practice	4	4				考查 Term Paper	2 夏	
PR193043	统计分析软件 Statistical Analysis Software	4 周	4		4		考查 Term Paper	3 夏	
PR193626	数学专业综合实训 Professional Comprehensive Training of Mathematics	32	2				考查 Term Paper	6	
PR194044	毕业设计(论文) Graduation Design(Thesis)	12 周	6		12		考查 Term Paper	8	

PR311602	军事技能训练 Military Training	2 周	2				考查 Term Paper	1	
总计 Total		18 周 +72 学 时	24		48				

7、课外实践（Extracurricular Practice）：6 学分（6 Credits）

包括主题教育活动、社会实践、志愿服务、勤工助学、学科竞赛、文体活动、创新创业活动、劳动实践等，其学分的认定按照教务处相关规定执行。

Extracurricular practice include Theme Education, Social Practice, Volunteer Service, Work-study Program, Discipline Competition, Cultural and Sports Activities, Innovative and Entrepreneurial Activities, Labor Practice and so on. The recognition of the credits for extracurricular practice shall be implemented according to the regulations of Academic Affairs Office.

数据计算及应用专业培养方案

Undergraduate Program in Data Calculation and Application

一、专业简介 (Major Introduction)

数据计算及应用(专业代码: 070104T)是教育部设立的数学类应用理科本科专业, 学制四年, 授予理学学士学位。学生将系统学习数学、统计、计算机、数据科学四个专业的核心主干课程, 接受科学计算、数据处理与程序设计的系统训练, 具备从海量数据中提取价值、建模求解实际问题的核心能力, 旨为国家培养兼具扎实数学、统计、计算技术实践能力的复合型人才。毕业生可在政府机关、金融机构、互联网企业、医疗与科研院所等单位, 从事数据分析、数据建模、大数据处理、算法设计与研发、科学与工程计算等工作, 也可在高校或科研机构继续深造, 攻读数据科学、统计学、计算机科学等方向的硕士/博士学位。

Data Computation and Applications (Major Code: 070104T) is an undergraduate program in applied mathematics established by the Ministry of Education. It has a four-year academic system and confers a Bachelor of Science degree. Students will systematically study the core fundamental courses of four disciplines: mathematics, statistics, computer science, and Data science, and receive rigorous training in scientific computing, data processing and programming. They will develop the core competence of extracting value from massive data and solving practical problems through modeling. The program aims to cultivate interdisciplinary talents for the country with solid capabilities in mathematics, statistics and practical computing techniques. Graduates can work in government agencies, financial institutions, Internet enterprises, medical institutions and research institutes, engaging in data analysis, data modeling, big data processing, algorithm design and development, scientific and engineering computing, and other related positions. They can also pursue further studies at universities or research institutions for master's or doctoral degrees in data science, statistics, computer science and other fields.

二、专业培养目标 (Academic Objectives)

本专业面向新兴行业对多学科交叉融合的复合型人才需求, 培养掌握数学、信息科学和统计学的基本理论、方法, 具备一定的数学建模、大数据分析以及程序设计能力, 具备解决实际问题 and 初步从事科学研究的能力, 具有良好的科学素养、创新精神和全球视野, 毕业后可在资源勘查、互联网、金融、医疗等领域从事大数据的采集、分析与处理等方面工作的德、智、体、美、劳全面发展的创新人才。

This major is geared to the needs of interdisciplinary and interdisciplinary talents in emerging industries. It cultivates innovative talents with all-round development in morality, intelligence, physical, aesthetic and labor, who grasping the basic theories and methods of mathematics, information science and statistics, having certain abilities of mathematical modeling analysis and big data analysis and program design, having the ability to solve practical problems and preliminary engage in scientific research, having good scientific literacy, innovative spirit and global vision. After graduation, they can be engaged in the collection, analysis and processing of big data in the fields of resource exploration, Internet, finance and medical treatment.

三、毕业要求 (Academic Requirement)

本专业学生主要学习现代数学、统计学和计算机科学的基础理论，系统地掌握科学计算和数据处理的技术和方法，能够对应用中的各类数据问题建立数学模型，并熟练地运用科学计算和数据处理技术解决这些实际问题。毕业生应获得以下几个方面的知识和能力：

(1) 具有良好的思想品德、社会公德、职业道德和法治素养，能够自觉认同并积极践行社会主义核心价值观，树立坚定理想信念与深厚家国情怀，恪守学术诚信与科研道德，具备责任担当、团队协作意识与人文素养，成长为德才兼备、全面发展的高素质人才；

(2) 具有良好的数学、统计学、计算机科学基础思维与方法，掌握数据科学理论和应用领域的基础知识，系统地进行数据思维训练，掌握数据科学的思想方法；

(3) 具有运用计算机和数据相关软件解决数据问题的初步能力；

(4) 熟悉数据应用领域（如地质资源、经济金融、生物医疗等），具有分析、解决应用领域实际问题的初步能力，以及开发典型案例的工程实践能力；

(5) 具有终身学习意识，能运用现代信息技术手段获取相关信息和新技术、新知识，持续提高创新能力；

(6) 具有较好英语应用能力，能阅读专业英文材料，具有宽广的国际视野和跨文化交流、竞争与合作能力；

(7) 掌握文件检索、资料查询的基本方法，有较强的自学能力和独立思考能力，具有一定的科学研究和实际工作能力；

(8) 具有良好的体魄和健康的身心以及一定的军事基本知识和国防意识，养成良好的体育锻炼和卫生习惯，达到国家规定的大学生体育和军事训练合格标准。具有良好的思想品德、社会公德和职业道德。

Students in this major mainly study the basic theory of modern mathematics, statistics and computer science, systematically master the scientific computing and data processing techniques and methods. They are cultivated to build mathematical model for all kinds of data problem in the application, and expertly use scientific computing and data processing technology to solve the practical problems. Graduates should acquire knowledge and abilities in the following aspects:

(1) Possess sound moral character, social ethics, professional ethics and legal literacy; consciously identify with and actively practice core socialist values; uphold firm ideals and convictions as well as profound patriotism; abide by academic integrity and research ethics; demonstrate a strong sense of responsibility, teamwork awareness and humanistic accomplishment, and develop into high-quality talents with both moral integrity and professional competence who achieve all-round development.

(2) Have good basic thought and methods of mathematics, statistics and computer science, master the basic knowledge of data science theory and application fields, conduct data thinking training systematically, and master the thinking and methods of data science;

(3) Initial ability to solve data problems with computers and data-related software;

(4) Familiar with data application fields (such as geological resources, economics and finance, biomedicine, etc.), have the preliminary ability to analyze and solve practical problems in application fields, and the engineering practice ability to develop typical cases;

(5) Have the consciousness of lifelong learning, can use modern information technology means to obtain relevant information and new technology, new knowledge, and continuously improve the innovation ability;

(6) Have good English application ability, be able to read professional English literature, have a broad international vision and cross-cultural communication, competition and cooperation ability;

(7) Master the basic methods of document retrieval and data inquiry, have strong self-learning ability and independent thinking ability, and have certain scientific research and practical work ability.

(8) Good physique, healthy body and mind as well as certain basic military knowledge and national defense consciousness, form good physical exercise and hygiene habits, to meet the national regulations of college students' physical education and military training qualified standards. Have a good ideological and moral character, social ethics and professional ethics.

四、主干学科 (Main disciplines)

数学、统计学、计算机科学、数据科学。

Mathematics, Statistics, Computer Science, Data Science.

五、学制与学位 (Length of Schooling and Degree)

学制四年，学生修满所规定的最低毕业 155 学分，达到规定的毕业要求后，授予理学学士学位。

The length of schooling is four years of full-time study. Students will be awarded the Bachelor Degree of Science when they have completed the required minimum credits and have met all other requirements.

六、核心课程 (Core Courses)

学科基础课：数学分析、高等代数与解析几何、概率论、常微分方程、数据计算及应用专业导论。

专业核心课：概率论、数理统计、数值分析、离散数学、多元统计分析、数据建模、运筹与优化、智能算法、数据结构与算法、数据库原理、模式识别与数据挖掘。

专业拓展课：数据计算及应用前沿课、机器学习、数学建模、矩阵计算、时间序列分析、金融数学、Python 程序设计、案例实务选讲、数据专业综合实训、深时大数据与地球演化、大数据技术原理与应用、地学数据分析与可视化、深时大数据与地球演化。

课程实践：Python 基础与应用、统计分析软件、大数据技术综合应用创新实践数据、毕业设计（论文）等。

Basic Courses: Mathematical Analysis, Advanced Algebra and Analytic Geometry, Probability Theory, Ordinary Differential Equations, Introduction to Data Calculation and Application.

Professional Core Courses: Probability Theory, Mathematical Statistics, Numerical Analysis, Discrete Mathematics, Multivariate Statistical Analysis, Data Modeling, Operations Research and Optimization, Intelligence Algorithm, Data Structure and Algorithm, Data Structure and Algorithm, Principles of Database Systems, Pattern Recognition and Data Mining.

Professional Development Courses: Frontier Courses of Data Calculation and Application, Machine Learning, Mathematical Modeling, Matrix Computations, Time Series Analysis, Financial Mathematics, Python Programming, Selected Cases, Professional Comprehensive Training, Deep Time Big Data and Earth Evolution, Principles and Applications of Big Data Technology, Geoscience Data Analysis and Visualization, Deep Time Big Data and Earth Evolution.

Course Practice: Python Foundation and Application, Innovative Practice of Comprehensive Application of Big Data Technology.

Practice of Data Structure: Fundamentals and Applications of Python, Statistical Analysis Software, Innovative Practice of Comprehensive Application of Big Data Technology , Graduation Design (Thesis) etc.

七、最低毕业总学分要求及学分分配 (Minimum Required Credits and Distribution)

课程模块 Course Module	课程类别 Course Classification	学时数 Hours	学分 Credits	学 期 Semester											
				1	2	1 夏	3	4	2 夏	5	6	3 夏	7	8	
通识教育 Liberal Education	通识教育必修课程 Required Courses of General Education	746	42	13.25	14.25		4.25	4.25		3.25	1.25	1	0.25	0.25	
	通识教育选修课程 Selective Courses of General Education	160	10												
专业教育 Professional Education	学科基础课程 Disciplinary Fundamental Courses	528	33	12	10		8	3							
	专业核心课程 Specialized Core Courses	480	30				6	9		9	6				
	专业拓展课程 Specialized Development Courses	240	15					4			4		19		
实践教育 Practical Education	课程实践 Course Practice	18 周+40 学时	22	2		6			4			4		6	
	课外实践 Extracurricular Practice	96	6												
必修课总学分 Required Course Credits				127											
选修课总学分 Elective Course Credits				31											
最低毕业总学分 Total Credits				158											

八、课程设置 (Curriculum)

1、通识教育必修课程(Required Courses of General Education): 746 学时(746 Hours), 42 学分(42 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR041002	计算机语言程序设计 Computer Language Programming	64	4	32	32		考试 Exam	2	
GR041011	人工智能概论 Introduction of Artificial Intelligence	32	2	16	16		考试 Exam	1	
GR081067	大学英语素质拓展课 Competence-oriented Education for College English	32	2				考试 Exam	2	
GR081071	大学英语(1) College English(1)	64	4	64			考试 Exam	1	
GR081072	大学英语(2) College English(2)	32	2				考试 Exam	2	
GR141005	体育(1)(系列课程) Physical Education(1)	32	1				考试 Exam	1	
GR141006	体育(2)(系列课程) Physical Education(2)	32	1				考试 Exam	2	
GR142007	体育(3)(系列课程) Physical Education(3)	32	1				考试 Exam	3	
GR142008	体育(4)(系列课程) Physical Education(4)	32	1				考试 Exam	4	
GR181008	中国近现代史纲要 Essentials of Modern Chinese History	48	3	48			考试 Exam	2	
GR181009	思想道德与法治 Ideological morality and rule of law	48	3				考试 Exam	1	
GR181013	形势与政策(1) Situation and Policy Education(1)	4	0.25	4			考查 Term Paper	1	
GR181014	形势与政策(2) Situation and Policy(2)	4	0.25				考查 Term Paper	2	

GR181015	形势与政策(3) Situation and Policy(3)	4	0.25				考查 Term Paper	3	
GR181016	形势与政策(4) Situation and Policy(4)	4	0.25				考查 Term Paper	4	
GR181017	形势与政策(5) Situation and Policy(5)	4	0.25				考查 Term Paper	5	
GR181018	形势与政策(6) Situation and Policy(6)	4	0.25				考查 Term Paper	6	
GR181019	形势与政策(7) Situation and Policy(7)	4	0.25				考查 Term Paper	7	
GR181020	形势与政策(8) Situation and Policy(8)	4	0.25				考查 Term Paper	8	
GR182014	马克思主义基本原理 The Fundamental Principles of Marxism	48	3				考试 Exam	3	
GR182022	习近平新时代中国特色社会主义思想概论 An Introduction to Xi Jinping Thought on Socialism with Chinese	48	3				考试 Exam	5	
GR182024	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thoughts and Theoretical System of the Chinese Characteristic Socialism	32	2	32			考试 Exam	4	
GR301004	大学生职业生涯规划与就业指导(1) Career Planning and Employment Guidance for University Students(1)	20	1	16	4		考试 Exam	2	
GR301005	大学生心理素质教育(1) Mental Health(1)	16	1	16			考查 Term Paper	1	
GR301024	劳动教育与双创实践(1) Labor Education and Innovation and Entrepreneurship Practice(1)	16	1	16			考查 Term Paper	2	
GR303005	大学生职业生涯规划与就业指导(2) Career Planning and Employment Guidance for University Students(2)	18	1	12	6		考试 Exam	6	

GR303006	大学生心理素质教育(2) Mental Health(2)	16	1	16			考查 Term Paper	4	
GR303025	劳动教育与双创实践(2) Labor Education and Innovation and Entrepreneurship Practice(2)	16	1		16		考查 Term Paper	3 夏	
GR311601	军事理论 Military Theory	36	2	36			考试 Exam	1	
总计 Total		746	42	308	74				

2、通识教育选修 (Selective Courses of General Education): 160 学时 (160 Hours), 10 学分 (10 Credits)

序号 No.	课程类别 Courses Classification	课程名称 Courses Name	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
1	人文社科类 (含在线课程) Humanities and Social Sciences Courses (Inc. Online Courses)	见附件 1	6	考查 Term paper	2-8	5 个类别中选修 6 个学分, 其中国家安全教育 1 学分、新生研讨 课 1 学分均为必选, 其他合计 4 学分。
2	自然科学类 (含在线课程) Natural Science Courses (Inc. Online Courses)	见附件 2		考查 Term paper	2-8	
3	生态文明类 (自然文化、碳中和) Ecological Civilization Courses (Natural Culture、 Carbon-Neutral)	见附件 3		考查 Term paper	2-8	

4	体育与健康类 Sports and Health Courses	见附件 4		考查 Term paper	2-8	
5	新生研讨课程 Freshman Seminar	见附件 5		考查 Term paper	1-2	
6	创新创业教育类（含在线课程） Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 6	2	考查 Term paper	2-8	
7	审美与艺术类 Aesthetics and Art Courses	见附件 7	2	考查 Term paper	2-8	
总计 Total			10			

3、学科基础课程(Disciplinary Fundamental Courses)：528 学时(528 Hours)，33 学分(33 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR190037	数据计算及应用专业导论 Introduction to the major of Data Computing and Application	16	1	16			考查 Term Paper	1	
DR191019	数学分析(1) Mathematical Analysis(1)	96	6	96			考试 Exam	1	
DR191614	高等代数与解析几何(1) Advanced Algebra and Analytic Geometry(1)	80	5	80			考试 Exam	1	
DR191615	高等代数与解析几何(2) Advanced Algebra and Analytic	80	5	80			考试 Exam	2	

	Geometry(2)								
DR191616	数学分析(2) Mathematical Analysis (2)	80	5				考试 Exam	2	
DR192025	概率论 Probability Theory	48	3	48			考试 Exam	4	
DR192617	数学分析(3) Mathematical Analysis (3)	80	5				考试 Exam	3	
SR192031	常微分方程 Ordinary Differential Equations	48	3	48			考试 Exam	3	
总计 Total		528	33	368					

4、专业核心课程(Specialized Core Courses)：480 学时(480 Hours)，30 学分(30 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR042247	数据结构与算法 Data Structure and Algorithm	48	3				考试 Exam	3	
PR193123	智能算法 Intelligent Algorithm	48	3				考查 Term Paper	6	
SR043017	数据库原理 Principles of Database Systems	48	3	48			考试 Exam	4	
SR043614	模式识别与数据挖掘 Pattern Recognition and Data Mining	48	3				考试 Exam	5	
SR192113	数据建模 Data Modeling	48	3	48			考查 Term Paper	4	
SR192115	离散数学 Discrete Mathematics	48	3				考试 Exam	3	
SR192618	运筹与优化 Operations Research and Optimization	48	3				考试 Exam	4	
SR193033	数理统计 Mathematical Statistics	48	3	48			考试 Exam	5	

SR193104	数值分析 Numerical Analysis	48	3				考试 Exam	5	
SR193108	多元统计分析 Multivariate Statistical Analysis	48	3				考试 Exam	6	
总计 Total		480	30	144					

5、专业拓展课程(Specialized Development Courses)：240 学时(240 Hours)，15 学分(15 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SR043267	大数据技术原理与应用 Principles and Applications of Big Data Technology	48	3				考试 Exam	7	
SR043268	数据分析及可视化 Data Analysis and Visualization	32	2				考试 Exam	7	
SR192032	数学建模 Mathematics Modeling	64	4	52	12		考查 Term Paper	4	
SR193037	金融数学 Financial Mathematics	48	3	48			考试 Exam	7	
SR193117	矩阵计算 Matrix Computations	32	2				考试 Exam	6	
SR194109	时间序列分析 Time Series Analysis	48	3				考试 Exam	7	
SR194110	案例实务选讲 Selected Cases	32	2				考查 Term Paper	7	
SS014104	深时大数据与地球演化 Deep-time Big-data and Earth's Evolution	32	2				考查 Term Paper	7	
SS193623	数据专业综合实训 Professional Comprehensive Training of Data	32	2				考查 Term Paper	6	

SS194120	机器学习 Machine Learning	48	3				考查 Term Paper	7	
SS194121	数据计算及应用前沿课 Frontier Courses of Data Calculation and Application	16	1				考查 Term Paper	7	
总计 Total		240	15	100	12				

6、课程实践(Course Practice)：18 周+40 学时(18 weeks and 40 Hours)，22 学分(22 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
PR181010	思想政治社会实践 Political Social Practice	32	2		32		考查 Term Paper	1 夏	
PR191624	Python 科学计算及应用 Python Scientific Computing and Applications	4	4				考查 Term Paper	1 夏	
PR192122	大数据技术综合应用创新实践 Innovative Practice of Comprehensive Application of Big Data Technology	4	4				考查 Term Paper	2 夏	
PR193043	统计分析软件 Statistical Analysis Software	4 周	4		4		考查 Term Paper	3 夏	
PR194044	毕业设计(论文) Graduation Design(Thesis)	12 周	6		12		考查 Term Paper	8	
PR311602	军事技能训练 Military Training	2 周	2				考查 Term Paper	1	
总计 Total		18 周 +40 学时	22		48				

7、课外实践 (Extracurricular Practice)：6 学分 (6 Credits)

包括主题教育活动、社会实践、志愿服务、勤工助学、学科竞赛、文体活动、创新创业活动、劳动实践等，其学分的认定按照教务处相关规定执行。

Extracurricular practice include Theme Education, Social Practice, Volunteer Service, Work-study Program, Discipline Competition, Cultural and Sports Activities, Innovative and Entrepreneurial Activities, Labor Practice and so on. The recognition of the credits for extracurricular practice shall be implemented according to the regulations of Academic Affairs Office.

《创新实验班》专业培养方案

Undergraduate Program in Innovation Experimental Class

一、专业简介 (Major Introduction)

创新实验班是我校拔尖创新人才培养的重要载体，实行“本-博”贯通培养模式。本专业遵循拔尖创新人才成长规律，立足重大基础科学问题和国家重大战略发展需求，遵循“加强基础、拓宽专业、因材施教、重点培养”的育人原则，深化学科交叉融合，实行研究型教学模式，注重学生个性化成长，致力于培养我校优势专业和学科领域的杰出领军人才。

The Innovative Experimental Class serves as a key platform for the cultivation of top-tier innovative talents in our university, adopting an integrated bachelor-doctor training model. In accordance with the growth laws of outstanding innovative talents and focusing on major fundamental scientific issues and national strategic development needs, this major adheres to the educational principles of "strengthening foundational knowledge, broadening professional scope, teaching students in accordance with their aptitude, and conducting targeted training". It advances interdisciplinary integration, implements research-oriented teaching modes, attaches importance to students' personalized development, and strives to cultivate outstanding leading talents in the dominant majors and disciplines of our university.

二、专业培养目标 (Academic Objectives)

本专业面向学校 18 个优势专业和学科领域对拔尖创新人才的需求，围绕地球科学、资源环境、工程技术、数理基础等重点方向，培养德、智、体、美、劳全面发展，适应现代自然科学发展需要的高素质人才。学生将掌握扎实数理化和计算机基础，系统掌握相关学科专业知识，具备国际视野、创新思维和团队协作能力，具备良好实践技能、自主学习及初步的科学研究能力。毕业生可在科研院所、高等院校及行业部门从事科学研究、技术开发与管理等工作。经过 5 年的实际工作，能够承担相关领域的科研课题或生产任务，具备独立开展工作的能力，有望成为行业内的学术骨干或技术中坚力量。

This major targets the demand for top-notch innovative talents across 18 dominant majors and disciplinary fields of the university. Focusing on key directions including geoscience, resources and environment, engineering technology, and mathematical foundation, it aims to cultivate high-quality talents with all-round development in morality, intelligence, physical health, aesthetics and labor literacy, who can meet the needs of modern natural science development. Students will acquire solid foundational knowledge in mathematics, physics, chemistry and computer science, as well as systematic professional expertise in relevant disciplines. They will be equipped with a global vision, innovative thinking and teamwork spirit, along with sound practical skills, independent learning ability and preliminary scientific research competence. Graduates are competent to engage in scientific research, technological development and management work at research institutes, institutions of higher education and industrial departments. With five years of work experience, they will be capable of undertaking research projects and production tasks in

related fields, working independently, and expected to grow into academic backbones and technical key members in the industry.

三、毕业要求 (Academic Requirement)

创新实验班 2 年级教学计划单列, 核心基础课程单独开班, 任课教师从校内择优遴选或聘请校外名师, 同时要求学生选修人文素质类课程, 培养形象思维能力。3-4 年级课程由导师与学生共同协商确定, 完成的总学分不低于 50 学分 (含教学实习、生产实习、毕业论文、思想政治课等学分)。学生可在导师指导下自由选择课程及学习方式, 充分体现个性化要求。

本科毕业时, 学生应具备以下的知识和能力:

1. 具有扎实的数理化和计算机基础知识, 拥有较强的中英文沟通、表达与写作能力, 具备较高的人文素养。
2. 系统掌握所学专业的基础理论、核心知识和基本技能, 熟悉所在学科方向的前沿发展和应用前景, 具有较强的实践能力和初步的科学研究能力。
3. 具有较强的自主学习能力和创新意识, 学术发展潜力大, 综合能力强, 心理素质好, 能够适应未来学术研究或职业发展需求。
4. 具有良好的思想品德、社会公德、职业道德和法治素养, 能够自觉认同并积极践行社会主义核心价值观, 树立坚定理想信念与深厚家国情怀, 恪守学术诚信与科研道德, 具备责任担当、团队协作意识与人文素养, 成长为德才兼备、全面发展的高素质人才。

For the 2nd grade of the Innovation Experimental Class, the teaching plan is separately formulated, and core basic courses are offered in independent classes. Teachers are carefully selected from the university or invited from outside as renowned experts. Meanwhile, students are required to take optional humanistic quality courses to cultivate their imaginative thinking ability. Courses for the 3rd to 4th grades are jointly determined through consultation between supervisors and students, with a total required credit of no less than 50 (including credits for teaching internships, production internships, graduation theses, ideological and political courses, etc.). Under the guidance of their supervisors, students can freely choose courses and learning methods, which fully reflects the requirement of personalized training.

Upon undergraduate graduation, students should possess the following knowledge and abilities:

1. Have solid basic knowledge in mathematics, physics, chemistry and computer science, strong Chinese and English communication, expression and writing abilities, as well as high humanistic literacy.
2. Systematically master the basic theories, core knowledge and basic skills of their major, be familiar with the cutting-edge development and application prospects of their disciplinary direction, and have strong practical ability and preliminary scientific research ability.
3. Have strong independent learning ability and innovative awareness, great potential for academic development, excellent comprehensive ability and good psychological quality, enabling them to adapt to the needs of future academic research or career development.
4. Students possesses good ideological and moral qualities, social morality, professional ethics and legal literacy, can consciously identify with and actively practice core socialist values, establish firm ideals and beliefs as well as a profound family and country feelings, abide by academic integrity and scientific research ethics, and have a sense of responsibility, team cooperation awareness and humanistic literacy, growing into a high-quality talent with both moral

integrity and ability and all-round development.

四、主干学科 (Main disciplines)

土木工程、城市地下空间工程、安全工程、材料科学与工程、计算机科学与技术、地理信息科学、水文与水资源工程、环境工程、石油工程、新能源科学与工程、测绘工程、遥感科学与技术、地球物理学、测控技术与仪器、海洋科学、数学与应用数学、经济学、信息管理与信息系统。

Civil Engineering、Urban Underground Space Engineering、Safety Engineering、Materials Science and Engineering、Computer Science and Technology、Geographical Information Science、Hydrology and Water Resources Engineering、Environmental Engineering、Petroleum Engineering、New Energy Science and Engineering、Surveying and Mapping Engineering、Remote Sensing Science and Technology、Geophysics、Measurement and Control Technology and Instruments、Marine Science、Mathematics and Applied Mathematics、Economics、Information Management and Information System

五、学制与学位 (Length of Schooling and Degree)

学制四年。学生修满规定的最低毕业学分，达到毕业要求后，授予理学、工学、经济学或管理学学士学位。

实施“本-博”贯通培养模式。学生完成本科规定学分后，可根据学习进展和导师意见，申请缩短本科修读年限，提前攻读博士学位。

The academic system is four years. After students complete the minimum required graduation credits and meet the graduation requirements, they will be awarded a bachelor's degree in Science, Engineering, Economics or Management.

The "bachelor-doctor" integrated training model is implemented. After completing the required undergraduate credits, students can apply to shorten the undergraduate study period and pursue a doctoral degree in advance based on their academic progress and the opinions of their supervisors.

六、核心课程 (Core Courses)

专业核心课程：由导师与学生共同确定修读课程，30 学分左右。

实践课程：综合物理实验、专业实习、生产实习、毕业论文。

Professional Core Courses: The courses to be taken are jointly determined by supervisors and students, with a total of about 30 credits.

Practice Courses: Comprehensive Physics Experiments, Professional Internship, Production Internship, Graduation Thesis.

七、最低毕业总学分要求及学分分配 (Minimum Required Credits and Distribution)

课程模块	课程类别 Course Classification	学时数 Hours	学分 Credits	学 期 Semester										
				1	2	1 夏	3	4	2 夏	5	6	3 夏	7	8
通识教育 Liberal Education	通识教育必修课程 Required Courses of General Education	682	38	13.25	10.25		4.25	3.25		4.25	2.25		0.25	0.25
	通识教育选修课程 Selective Courses of General Education	160	10											
专业教育 Professional Education	学科基础课程 Disciplinary Fundamental Courses	456	28.5	6	4		11.5	6						
	专业核心课程 Specialized Fundamental Courses	480	30											
	专业拓展课程 Specialized Development Courses	336	21											
实践教育 Practical Education	课程实践 Course Practice	28 周+64 学时	26			6	2		6			6		6
	课外实践 Extracurricular practice		6											
必修课总学分 Required course credits				122.5										
选修课总学分 Elective course credits				37										
最低毕业总学分 Total Credits				159.5										

八、课程设置 (Curriculum)

1、通识教育课程 (General Education Courses): 682 学时(682 hours), 38 学分(38 Credits)

课程 代码 Code	课程 名称 Courses Name	总学时 Hours	学分 Credits	讲课 学时 Lec.	实验 学时 Exp.	线上 学时 Online	考核 方式 Assessment	开课 学期 Semester	备注 Notes
GR181009	思想道德与法治 Ideological Morality and Rule of Law	48	3	40	8		考试 Exam	1	
GR181008	中国近现代史纲要 Essentials of Modern Chinese History	48	3	40	8		考试 Exam	2	
GR182014	马克思主义基本原理 Fundamental Principles of Marxism	48	3	40	8		考试 Exam	3	
GR182024	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thoughts and Theoretical System of the Chinese Characteristic Socialism	32	2	32			考试 Exam	4	
GR182022	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics in the New Era	48	3	48			考试 Exam	5	
GR181013	形势与政策 (1) Situation and Policy (1)	4	0.25	4			考查 Term paper	1	
GR181014	形势与政策 (2) Situation and Policy (2)	4	0.25	4			考查 Term paper	2	
GR181015	形势与政策 (3) Situation and Policy (3)	4	0.25	4			考查 Term paper	3	
GR181016	形势与政策 (4) Situation and Policy (4)	4	0.25	4			考查 Term paper	4	

GR181017	形势与政策（5） Situation and Policy（5）	4	0.25	4			考查 Term paper	5	
GR181018	形势与政策（6） Situation and Policy（6）	4	0.25	4			考查 Term paper	6	
GR181019	形势与政策（7） Situation and Policy（7）	4	0.25	4			考查 Term paper	7	
GR181020	形势与政策（8） Situation and Policy（8）	4	0.25	4			考查 Term paper	8	
GR301004	大学生职业生涯规划与就业指导（1） Career Planning and Employment Guidance for University Students (1)	20	1	16	4		考试 Exam	2	
GR303005	大学生职业生涯规划与就业指导（2） Career Planning and Employment Guidance for University Students (2)	18	1	12	6		考试 Exam	6	
GR301005	大学生心理素质教育（1） Mental Health (1)	16	1	16			考查 Term Paper	1	
GR303005	大学生心理素质教育（2） Mental Health (2)	16	1	16			考查 Term Paper	5	
GR301024	劳动教育与双创实践(1)Labor Education and Innovation and Entrepreneurship Practice(1)	16	1	16			考查 Term Paper	2	
GR303025	劳动教育与双创实践(2)Labor Education and Innovation and Entrepreneurship Practice(2)	16	1	16			考查 Term Paper	6	
GR311601	军事理论 Military Theory	36	2	36			考试 Exam	1	
GR081071	大学英语（1） College English (1)	64	4	64			考试 Exam	1	

GR081072	大学英语 (2) College English (2)	32	2	32			考试 Exam	2	
GR081067	大学英语素质拓展课 Competence-oriented Education for College English	32	2	32			考试 Exam	2	
GR141005	体育 (1) (系列课程) Physical Education (1)(series of courses)	32	1		32		考试 Exam	1	
GR141006	体育 (2) (系列课程) Physical Education (2) (series of courses)	32	1		32		考试 Exam	2	
GR142007	体育 (3) (系列课程) Physical Education (3) (series of courses)	32	1		32		考试 Exam	3	
GR142008	体育 (4) (系列课程) Physical Education (4) (series of courses)	32	1		32		考试 Exam	4	
GR041011	人工智能概论 Introduction to Artificial Intelligence	32	2	32			考试 Exam	1	
总计 Total		682	38	520	162				

2、通识教育选修课程 (Selective Courses of General Education): 160 学时(160 hours), 10 学分(10 Credits)

序号 No.	课程类别 Courses Classification	课程名称 Courses Name	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
1	人文社科类 (含在线课程) Humanities and Social Sciences Courses (Inc. Online Courses)	见附件 1	6	考查 Term paper	2-8	5 个类别中选修 6 个学分, 其中国家安全教育 1 学分、新生研 讨课 1 学分均为必选,

2	自然科学类（含在线课程） Natural Science Courses (Inc. Online Courses)	见附件 2		考查 Term paper	2-8	其他合计 4 学分。
3	生态文明类（自然文化、碳中和） Ecological Civilization Courses(Natural Culture、Carbon-Neutral)	见附件 3		考查 Term paper	2-8	
4	体育与健康类 Sports and Health Courses	见附件 4		考查 Term paper	2-8	
5	新生研讨课程 Freshman Seminar	见附件 5		考查 Term paper	1-2	
6	创新创业教育类（含在线课程） Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 6	2	考查 Term paper	2-8	
7	审美与艺术类 Aesthetics and Art Courses	见附件 7	2	考查 Term paper	2-8	
总计 Total			10			

3、学科基础课程（Disciplinary Fundamental Courses）：456 学时(440hours)，28.5 学分(28.5Credits)

课程 代码 Code	课程 名称 Courses Name	总学时 Hours	学分 Credits	讲课 学时 Lec.	实验 学时 Exp.	线上 学时 Online	考核 方式 Assessment	开课 学期 Semester	备注 Notes
DR191001	高等数学 A (1) Advanced Mathematics A (1)	96	6	96			考试 Exam	1	2 选 1
DR191002	高等数学 B(1) Advanced Mathematics A (1)	96	6	96			考试 Exam	1	
DR191003	高等数学 A (2) Advanced Mathematics A (2)	96	6	96			考试 Exam	2	2 选 1
DR191004	高等数学 B (2) Advanced Mathematics A (2)	64	4	64			考试 Exam	2	
DR192605	线性代数 A Linear Algebra	40	2.5	40			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistic	48	3	48			考试/考查 Exam/Term Paper	4	
DR192198	数理纵横谈 Perspectives on Mathematics and Physics	32	2	32			考查 Term Paper	3	
DR192133	运筹与控制 Operations Research and Control	48	3	48			考试 Exam	4	
DR042300	Python 语言程序设计 Python Programming	32	2	18	14		考试 Exam	3	
DR042247	数据结构与算法	48	3	36	12		考试	3	

	Data Structures and Algorithms						Exam		
GR083059	英语听说 English Listening and Speaking	48	3	48			考试 Exam	3	
总计 Total		最低 456	最低 28.5	最低 430	26				

4、专业核心课程（Specialized Core Courses）：480 学时(480 hours)，30 学分(30 Credits)

注：创新班的专业核心课程由导师和学生共同确定，30 学分左右。

5、专业拓展课程（Specialized Development Courses）：336 学时(336hours)，21 学分(21Credits)

课程 代码 Code	课程 名称 Courses Name	总学时 Hours	学分 Credits	讲课学 时 Lec.	实验 学时 Exp.	线上 学时 Online	考核 方式 Assessment	开课 学期 Semester	备注 Notes
DR191608	大学物理 B（1） College Physics (1)	48	3	48			考试 Exam	2	
DR192609	大学物理 B（2） College Physics (2)	48	3	48			考试/考察 Exam/ Term Paper	3	
SR192103	复变函数 Complex Analysis	48	3	48			考试 Exam	3	
SS192622	数学物理方程 Mathematical Physics equations	48	3	48			考试 Exam	4	
DR192130	数学建模 Mathematical Modeling	48	3	32	16		考试 Exam	4	
DR192135	光电器件及应用 Optoelectronic Devices and Applications	48	3	38	10		考试 Exam	4	
DR192199	化学通论	64	4	64			考试	3	

	General Chemistry						Exam		
DR192132	量子力学导论 Introduction to Quantum Mechanics	32	2	32			考试 Exam	4	
DR192131	学科前沿课 Frontier Courses	32	2	32			考查 Term Paper	4	
SS192619	机器学习 Machine Learning	32	2	20	12		考试 Exam	4	
总计 Total		最低 336	最低 21						

注：全校开设的课程均可选修。本模块最低 21 学分。

6、课程实践（Course Practice）：28 周+64 学时(28 weeks and 64 hours)，26 学分(26Credits)

课程 代码 Code	课程 名称 Courses Name	总学时 Hours	学分 Credits	讲课 学时 Lec.	实验 学时 Exp.	线上 学时 Online	考核 方式 Assessment	开课 学期 Semester	备注 Notes
PR311003	军事技能训练 Military Theory and Practice	2 周	2				考查 Term Paper	1 夏	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2		32		考查 Term Paper	1 夏	
DR192197	综合物理实验 Comprehensive Physics Experiment	32 学时	2		32		考试 Exam	3	
PR193053	毕业论文 Graduation Thesis	12 周	6				考查 Term Paper	8	
总计 Total		28 周 +64 学时	26						

注：专业教学实习、专业实习等按所属专业统一安排开展。本模块最低 26 学分。

7、课外实践（Extracurricular practice）：6 学分(6Credits)

包括主题教育活动、社会实践、志愿服务、勤工助学、学科竞赛、文体活动、创新创业活动、劳动实践等。Extracurricular practice include Theme Education, Social Practice, Volunteer Service, Work-study Program, Discipline Competition, Cultural and Sports Activities, Innovative and Entrepreneurial Activities, Labor Practice and so on.

九、课程与毕业要求关系矩阵（工程教育认证专业类专业参考）

(样例)

毕业要求 课程名称	(1) 工程知 识	(2) 问题分 析	(3) 设计/开 发解决 方案	(4) 研究	(5) 使用现 代工具	(6) 工程与 社会	(7) 环境和 可持续 发展	(8) 职业规 范	(9) 个人和 团队	(10) 沟通	(11) 项目管 理	(12) 终身学 习
思想道德修养和法律基础								H		L		
毛泽东思想和中国特色社会主义理论体系概论								H				
中国近现代史纲要								L				
马克思主义基本原理								M			L	M
现代企业管理								M			H	
心理健康教育										L		L
大学生职业发展与就业指导I、II									M			M
体育									L			H
军事训练									H			

军事理论									M			
应用写作										H		
音乐鉴赏										L		
大学英语										H		
高等数学	H	H		L								

注：创新班学生的本科毕业专业为工程教育认证类的，参照对应专业工程教育认证相关标准与要求。