

信息工程学院

School of Information Engineering



地理信息科学专业培养方案

一、专业培养目标

本专业面向资源与环境领域对地理信息人才需求，围绕大地学背景下的多层次复合型高素质创新人才培养需要，培养德、智、体、美、劳全面发展，掌握地理信息系统、遥感、卫星定位及地图制图学基础知识、基本理论和基本技能，具备一定的地理空间信息技术设计、开发和应用能力，具有理想信念和责任心，毕业后可在地理信息相关领域从事科学研究、应用开发、教学和管理等方面工作或进一步在本领域深造的专门人才。

二、毕业要求

(1) 具有坚定正确的政治方向、良好的思想品德和健全的人格，热爱祖国，热爱人民，拥护中国共产党的领导，遵纪守法，团结协作，践行社会主义核心价值观。

(2) 树立科学的世界观、人生观和价值观，具备良好的人文社会科学素养和强烈的社会责任感，人格健全、身心健康、尊重生命。正确处理人、社会、自然三者关系。

(3) 具有扎实的数理基础知识和基本实验技能，形成科学规范的自然科学世界观和方法论，掌握正确的学习方法。

(4) 具备系统的地理信息系统、地图制图学、遥感科学和技术、计算机科学的基本理论和基本知识，掌握基本的研究方法，了解本专业及相关领域新动态和发展趋势。具有地学信息获取与数据分析的能力，具有一定的应用地学信息技术解决本专业 ze 问题的能力。具备较强的地理空间信息工程设计、开发、维护和管理能力以及用地理信息科学和技术从事教学、科研、工程开发和业务管理的实践能力。

(5) 具有一定的地学逻辑思维能力和批判性思维精神。

(6) 具有一定的地学空间信息专业综合能力和创新能力。

(7) 具有一定的沟通表达能力。能够通过口头和书面表达方式与同行、社会公众进行有效沟通。具有良好的团队合作能力。能够与团队成员和谐相处，协作共事，在团队活动中发挥积极作用。

(8) 了解国际动态，关注全球性问题，尊重世界不同文化的差异性和多样性；具有安全意识、环保意识和可持续发展意识。

(9) 具有终身学习意识和自我管理、自主学习和实现个人可持续发展的能力。

三、主干学科

地理学、测绘科学与技术、计算机科学与技术。

四、学制与学位

学制四年。学生修满规定的最低毕业学分，达到毕业要求后，授予理学学士学位。

五、核心课程

专业核心课程：测量学、自然地理学、人文地理学、地理信息系统原理、地图学、GIS 程序设计基础、数据结构基础、遥感原理与方法、空间数据库原理、卫星导航定位原理与应用、遥感图像处理、GIS 设计与开发、三维地理信息系统、GIS 空间分析、地统计学、数字图像处理、GIS 专业英语、城市地理信息系统、遥感地学应用、网络地理信息系统、国土资源监测与评价。

实践课程：教学实习、GIS 软件实习、3S 综合实习、虚拟地理环境、GIS 生产实习、毕业设计（论文）等。

Undergraduate Program in Geographic Information Science

1. Academic Objectives

Aiming at cultivating multi-level compound innovative talents with the background of Geosciences for resource and environment filed, this program firstly cultivates all-round developed talents in terms of morality, intelligence, physique, aesthetics and labor. This program educates future engineers mastering fundamental theories and skills on geographic information system, remote sensing, satellite positioning and cartography with designing, developing and practical ability of Geoinformatics and with firm ideal, faith and responsibility. After graduation, the graduates are capable of the following careers, such as scientific research, education & training, software design & development, and project management related to Geoinformatics in resource and environment filed. Some students will choose further study on this major and will affiliate with institutes, universities and government departments.

2. Graduation Requirements

(1) Have a firm and correct political orientation, good ideological morality and a sound personality, love the motherland, love the people, support the leadership of the Communist Party of China and practice socialist core values.

(2) Have a scientific spirit, humanities, professionalism, a sense of social responsibility and a positive attitude towards life, understand national conditions, social conditions and people's conditions, and can correctly handle on the relationships among human, society and nature.

(3) Possess solid theories and knowledge of mathematics and physics and basic experimental skills, form normative world view of natural science and methodology, and master the correct way to study.

(4) Possess systematic theories and knowledge of geographic information systems, cartography, remote sensing science and technology, and computer science systematically, master basic research methods, and understand new trends and development trends in this major and related fields. Have the ability to acquire geoscience information and analyze data, and have the ability to apply geoscience information technology to solve practical problems in the major. Possess strong geospatial information engineering design, development, maintenance and management capabilities, as well as the practical ability to use geospatial information science and technology to engage in teaching, scientific research, engineering development and business management.

(5) Possess a certain degree of geoscience logical thinking ability and critical thinking spirit.

(6) Possess a certain comprehensive ability and innovation ability in geoscience spatial information specialty.

(7) Have certain communication skills. Able to communicate effectively with colleagues and the public through oral and written expressions. Have good teamwork ability. Able to get along with team members, work collaboratively, and play an active role in team activities.

(8) Understand international trends, pay attention to global issues, respect the differences and diversity of different cultures in the world; have a sense of safety, environmental protection and sustainable development.

(9) Possess lifelong learning awareness and self-management and independent learning capabilities which can ensure self-sustainable development.

3. Main disciplines

Geography, Surveying and Mapping Science and Technology, computer science and technology.

4. Length of Schooling and Degree

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.

5. Core Courses

The core courses for this program are Surveying, Geography, Introduction to Geo-information Science, Principles of Geographic Information System, Cartography, GIS Data Structures, Principles and Techniques of Remote Sensing, GeoDatabase, GPS Technology and Applications, Remote Sensing Image Processing, GIS Design and Development, Three-dimensional GIS, Spatial Analysis in GIS, Geo-statistics, Digital image processing, Academic English for Geoinformatics, Urban GIS, Remote Sensing Applications in Geosciences, WebGIS, Monitoring and Evaluation of Land Resources, etc.

The main practical courses are Practices related to some courses, GIS Software Practice, 3S Comprehensive Practice, Virtual Geographical Environment, GIS productive practice, Thesis, etc.

六、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	730	40	11	13		4	5	1	3	1			2
	通识教育选修课程 Selective Courses of General Education	192	12	2										
	学科基础课程 Disciplinary Fundamental Courses	936	58.5	8	15.5		18	9		8				
专业教育 Professional Education	专业核心课程 Specialized Fundamental Courses	432	27					6		12	9			
	专业拓展课程（选修） Specialized Development	48	3										3	
实践教育 Practical Education	课程实践 Course Practice	23 周 +128 学时	25			2	3		5		3	6		6
	课外实践 Extracurricular practice		6											
必修课总学分 Required course credits				149.5										
选修课总学分 Elective course credits				21										
最低毕业总学分 Total Credits				170.5										

七、课程设置 (Curriculum)

1、通识教育必修课程 (Required Courses of General Education): 730 学时 (730 Hours), 41 学分 (41 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
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	
GR183004	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	64	4	48	16		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	

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
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	
GR303006	大学生心理素质教育 (2) Mental Health (2)	16	1	16			考查 Term Paper	5	
GR302008	军事理论 Military Theory	36	1	36			考查 Term Paper	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)	32	1		32		考试 Exam	1	
GR141006	体育 (2) (系列课程) Physical Education (2)	32	1		32		考试 Exam	2	
GR142007	体育 (3) (系列课程) Physical Education (3)	32	1		32		考试 Exam	3	
GR142008	体育 (4) (系列课程) Physical Education (4)	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	10	12	10	考试 Exam	1	
GR041003	程序设计基础 A Fundamentals of Programming A	64	4	24	24	16	考试 Exam	2	
总计 Total		730	41	486	218	26			

2、通识教育选修 (Selective Courses of General Education): 192 学时 (192Hours), 12 学分 (12 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	7	考查 Term Paper	2-8	4 个类别中选修 7 个学分, 其中,《大学生安全教育》(1 学分) 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	
3	自然文化类 Natural Culture Courses	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	5-8	
5	创新创业教育类 (含在线课程) Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5	3	考查 Term Paper	2-8	选修 3 个学分, 其中《新生研讨课》(1 学分) 必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 6	2	考查 Term Paper	2-4	
总计 Total			12			

3、学科基础课程 (Disciplinary Fundamental Courses): 936 学时 (936 Hours), 57.5 学分 (57.5 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR040014	地理信息科学专业导论 Introduction to Geographic Information Science	16	1	16			考查 Term Paper	1	
DR191001	高等数学 A (1) Advanced Mathematics A(1)	96	6	96			考试 Exam	1	
DR191002	高等数学 A (2) Advanced Mathematics A(2)	96	6	96			考试 Exam	2	
DR011036	地球科学概论 Introduction to Earth Science	64	4	32	32		考试 Exam	2	
DR122001	测量学 A Surveying A	40	2.5	24	16		考试 Exam	2	
DR041028	自然地理学 Physical Geography	48	3	42	6		考试 Exam	2	双语
DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistic	48	3	48			考试 Exam	3	

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
DR042029	人文地理学 Human Geography	48	3	48			考试 Exam	3	
DR042249	地理信息系统原理 Principles of Geographic Information System	48	3	48			考试 Exam	3	
DR042031	地图学 Cartography	48	3	32		16	考试 Exam	3	
DR042032	GIS 程序设计基础 Fundamental of GIS Programming	64	4	32		32	考试 Exam	3	
DR042033	数据结构基础 Data Structures	48	3	32		16	考试 Exam	4	GIS 教研室 开课, 与电 子专业合 上
DR042034	遥感原理与方法 Principles and Techniques of Remote Sensing	48	3	40		8	考试 Exam	4	
DR042035	卫星导航定位原理与应用 Principles and Applications of GNSS	48	3	28	14	6	考试 Exam	4	
DR043036	空间数据库原理 Principles of Spatial Database	64	4	32		32	考试 Exam	5	
DR043037	遥感图像处理 Remote Sensing Image Processing	64	4	32		32	考试 Exam	5	
总计 Total		936	57.5	718	76	142			

4、专业核心课程 (Specialized Core Courses): 432 学时 (432 Hours), 27 学分 (27 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SR042038	GIS 设计与开发 GIS Design and Development	64	4	32		32	考试 Exam	4	
SR042039	三维地理信息系统 Three-dimensional GIS	32	2	16		16	考查 Term Paper	4	
SR043040	GIS 空间分析 Spatial Analysis in GIS	48	3	30		18	考试 Exam	5	
SR043202	网络地理信息系统 Web Geographic Information System	32	2	8		24	考查 Term Paper	5	
SR043045	国土资源监测与评价 Monitoring and Evaluation of Land Resources	48	3	32		16	考查 Term Paper	5	
SR043042	GIS 专业英语 Academic English for Geoinformatics	32	2	32			考试 Exam	5	
SR043041	地统计学 Geo-statistics	32	2	16		16	考试 Exam	5	
SR043043	城市地理信息系统 Urban GIS	48	3	32		16	考试 Exam	6	
SR043044	遥感地学应用 Remote Sensing Applications in Geosciences	48	3	32		16	考试 Exam	6	
SR044119	数字图像处理 Digital Image Processing	48	3	32		16	考试 Exam	6	与电子专业 合上, 电子教 研室开课
总计 Total		432	27	262		170			

5、专业拓展课程 (Specialized Development Courses): 240 学时 (240 Hours), 最少选修 3 学分 (3 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SS044203	地球科学大数据原理与应用 Principles and Applications of Big Data in Earth Science	32	2	32			考查 Term Paper	7	
SS044204	地理空间智能 Geospatial Intelligence	32	2	22	10		考查 Term Paper	7	
SS040093	移动地理信息系统 Mobile Geospatial Information System	16	1	16			考查 Term Paper	7	
SS044205	景观格局空间分析技术与应用 Landscape Pattern Analysis Technology and Application	32	2	16	16		考查 Term Paper	7	
SR122045	土地资源学 Land Resources Science	48	3	36	12		考试 Exam	7	
SS122115	自然资源调查与管理 Natural Resources Investigation and Management	32	2	32			考查 Term Paper	7	
DR123035	土地生态学 Land Ecology	48	3	40	8		考试 Exam	7	
总计 Total		240	15	194	46				

6、课程实践 (Course Practice): 23 周 +128 学时 (23 weeks and 128 hours), 24 学分 (24 Credits)

课程代码 Course Code	课程名称 Course Name	周数 (学时) Week(hour)	学分 Credits	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	1	考查 Term Paper	1	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考查 Term Paper	1 夏	
PR042049	GIS 软件实习 GIS Software Practice	48 学时	3	考查 Term Paper	3	
PR042050	3S 综合实习 3S Comprehensive Practice	3 周	3	考查 Term Paper	2 夏	
PR043052	虚拟地理环境 Virtual Geographical Environment	48 学时	3	考查 Term Paper	6	
PR043053	专业实习 Productive practice	6 周	6	考查 Term Paper	3 夏	
PR044054	毕业设计 (论文) Graduation Design (Thesis)	12 周	6	考查 Term Paper	8	
总计 Total		23 周 +128 学时	24			

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.

电气工程及其自动化专业培养方案

一、专业培养目标

本专业面向国家电力行业需求，培养德、智、体、美、劳全面发展，掌握控制理论、电工理论、信息理论等基本理论，掌握控制技术、电力电子技术、信息技术等关键技术，具有良好科学素养、实践创新能力与组织管理能力的宽口径复合型高级工程技术人才。毕业生能够服务于与电气工程相关的装备制造、系统运行、自动控制、工业过程控制、电力电子、检测与自动化仪表等领域。经过五年的实际工作，能够承担工程设计、系统分析、信息处理、试验分析、研究开发、经济管理等部门工作。

二、毕业要求

学生毕业前应完成本专业系统课程训练，达到高级工程技术人才的基本要求，具体如下：

- (1) 具有高素质、高层次、多样化、创造性人才所具备的人文精神及人文社科背景知识；
- (2) 具有提出和解决实际问题的能力、进行有效交流和团队合作的能力；
- (3) 掌握电气工程和自动控制领域扎实的基础理论、专门知识；
- (4) 掌握电气工程和自动控制领域系统分析、研究开发与工程设计的基本方法和基本技能；
- (5) 具有在相关专业领域跟踪和发展新理论、新知识、新技术的能力；
- (6) 能从事相关专业领域的科学研究、技术开发、教育和管理等工作。

三、主干学科

控制科学与工程。

四、学制与学位

学制四年。学生修满规定的最低毕业学分，达到毕业要求后，授予工学学士学位。

五、核心课程

专业核心课程：传感器原理，自动控制原理，电力系统分析，电力电子技术，电力系统继电保护，发电厂电气部分，高电压技术。

实践课程：电路实验，模拟电子技术实验，数字电子技术实验，电机与拖动实验，传感器原理课程设计，电子工艺实习，电力系统分析实验，电力电子技术课程设计，专业实习，毕业设计（论文）。

Undergraduate Program in Electrical Engineering and Automation

1. Academic Objectives

Facing the needs of the national power industry, this major cultivates all-round and compound advanced engineering technical talents with comprehensive development of morality, intelligence, sports, beauty and labor, mastering basic theories such as control theory, electrical theory and information theory, mastering key technologies such as control technology, power electronic technology and information technology, and with good scientific literacy, practical innovation ability and organization and management ability. Graduates can serve in electrical engineering related equipment manufacturing, system operation, automatic control, industrial process control, power electronics, detection and automation instrumentation and other fields. After five years of practical work, graduates can undertake engineering design, system analysis, information processing, experimental analysis, research and development, economic management and other departmental work.

2. Graduation Requirements

Before graduation, students should complete the system course training of this major to meet the basic requirements of electrical engineers, as follows:

- (1) Have the humanistic spirit and background knowledge of Humanities and Social Sciences possessed by high-quality, high-level, diversified and creative talents;
- (2) Have the ability to propose and solve practical problems, communicate effectively and work in a team;
- (3) Master the solid basic theory and specialized knowledge in the field of electrical engineering and automatic control;
- (4) Master the basic methods and skills of system analysis, R&D and engineering design in the field of electrical engineering and automatic control;
- (5) Have the ability to track and develop new theories, new knowledge and new technologies in relevant professional fields;
- (6) Be able to engage in scientific research, technology development, education and management in related professional fields
- (9) Possess lifelong learning awareness and self-management and independent learning capabilities which can ensure self-sustainable development.

3. Main disciplines

Control Science and Engineering.

4. Length of Schooling and Degree

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.

5. Core Courses

Specialized Core Courses: Principle of Transducers, Principle of Automatic Control, Power System Analysis, Power Electronics Technology, Power System Relay Protective, Electrical Systems of Power Plants, High Voltage Technology

Practice Courses: Circuit Experiments, Experiments of Analog Electronic Technology, Experiments

of Digital Electronic Technology, Experiments of Electric Machinery and Drive, Principles of Transducers Course Design, Practice of Electronic Techniques, Experiments of Power System Analysis, Power Electronic Technology Course Design, Major Practice, Graduation Design (Thesis).

六、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	730	40	11	13	1	4	5		3	1			2
	通识教育选修课程 Selective Courses of General Education	192	12											
	学科基础课程 Disciplinary Fundamental Courses	840	52.5	10	13		15.5	14						
专业教育 Professional Education	专业核心课程 Specialized Fundamental Courses	352	22					5		9	5		3	
	专业拓展课程 Specialized Development	96	6							10	6		4	
	课程实践 Course Practice	22 周 +160 学 时	27		2	2	5	3	2	6	2			6
实践教育 Practical Education	课外实践 Extracurricular practice	96	6											
	必修课总学分 Required course credits	141.5												
选修课总学分 Elective course credits		23												
最低毕业总学分 Total Credits		165.5												

七、课程设置 (Curriculum)

1、通识教育必修课程 (Required Courses of General Education): 730 学时 (730 Hours), 40 学分 (40 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
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	
GR183004	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	64	4	48	16		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	

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
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	
GR303006	大学生心理素质教育 (2) Mental Health (2)	16	1	16			考查 Term Paper	5	
GR302008	军事理论 Military Theory	36	1	36			考查 Term Paper	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)	32	1		32		考试 Exam	1	
GR141006	体育 (2) (系列课程) Physical Education(2)	32	1		32		考试 Exam	2	
GR142007	体育 (3) (系列课程) Physical Education(3)	32	1		32		考试 Exam	3	
GR142008	体育 (4) (系列课程) Physical Education (4)	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	10	12	10	考试 Exam	1	
GR041003	程序设计基础 A Fundamentals of Programming A	64	4	24	24	16	考试 Exam	2	
总计 Total		730	40	486	218	26			

2、通识教育选修 (Selective Courses of General Education): 192 学时 (192Hours), 12 学分 (12 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	7	考查 Term Paper	2-8	4 个类别中选修 7 个学分, 其中,《大学生安全教育》(1 学分) 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	
3	自然文化类 Natural Culture Courses	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	5-8	
5	创新创业教育类 (含在线课程) Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5	3	考查 Term Paper	2-8	选修 3 个学分, 其中《新生研讨课》(1 学分) 必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 6	2	考查 Term Paper	2-4	
总计 Total			12			

3、学科基础课程 (Disciplinary Fundamental Courses): 848 学时 (848 Hours), 52.5 学分 (52.5 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
IS040012	电气工程及其自动化专业导论 Introduction to Electrical Engineering and Its Automation	16	1	16			考查 Term Paper	1	必选
DR191001	高等数学 A (1) Advanced Mathematics A(1)	96	6	96			考试 Exam	1	
DR191002	高等数学 A (2) Advanced Mathematics A(2)	96	6	96			考试 Exam	2	
DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192018	复变函数与积分变换 Complex Variable Functions and Integral Transformations	48	3	48			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistics	48	3	48			考试 Exam	4	
DR191101	大学物理 A (1) College Physics A(1)	64	4	64			考试 Exam	2	
DR192102	大学物理 A (2) College Physics A(2)	64	4	64			考试 Exam	3	
DR021002	工程图学 Engineering Graphics	48	3	40	8		考试 Exam	1	
DR042079	电路分析基础 Fundamentals of Circuit Analysis	48	3	48			考试 Exam	2	
DR042207	模拟电子技术 Analog Electronic Technology	56	3.5	56			考试 Exam	3	
DR043084	数字电子技术 Digital Electronics Technique	48	3	48			考试 Exam	3	
DR102131	单片机原理及接口技术 Principle and Interface Technology of Microcontrollers	64	4	48	16		考试 Exam	4	
DR102132	信号与系统 Signals and Systems	64	4	56	8		考试 Exam	4	
SR042250	工程电磁场 Engineering Electromagnetics	48	3	48			考试 Exam	4	
总计 Total		848	53	824	24				

4、专业核心课程 (Specialized Core Courses): 352 学时 (352 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
SR042088	传感器原理 Principle of Transducers	32	2	32			考试 Exam	4	
DR042082	电机与拖动 Electric Machinery and Drive	48	3	48			考试 Exam	4	
SR043208	自动控制原理 Principle of Automatic Control	48	3	48			考试 Exam	5	
SR043091	电力系统分析 Power System Analysis	48	3	48			考试 Exam	5	
SR043094	电力电子技术 Power Electronics Technology	48	3	48			考试 Exam	5	
SR043209	电力系统继电保护 Power System Relay Protective	48	3	32	16		考试 Exam	6	
SR043210	发电厂电气部分 Electric Elements of Power Plants	32	2	32			考试 Exam	6	
SR044100	高电压技术 High Voltage Technology	48	3	48			考试 Exam	7	
总计 Total		352	22	336	16				

5、专业拓展课程 (Specialized Development Courses): 368 学时 (368 Hours), 23 学分 (23 Credits), 要求最低选修 6 学分 (6 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
SS043211	电气控制技术 Electric Control Technology	48	3	32	16		考试 Exam	5	
SS043212	机器人控制技术 Robot Control Technology	48	3	32	16		考试 Exam	5	
SR103031	新型单片机应用与实践 Application and Practice of New MCUs	32	2	8	24		考查 Term Paper	5	
PR043213	电学仿真软件实践 Practice of Electrical Simulation Software	32	2	12	20		考查 Term Paper	5	
DR103133	数字信号处理 C Digital Signal Processing C	64	4	56	8		考试 Exam	5	
SS043215	供电技术 Power Supply Technology	48	3	40	8		考试 Exam	6	
SS043216	人工智能原理 Principles of Artificial Intelligence	32	2	24	8		考试 Exam	6	
SS044217	电力拖动自动控制系统 Electric Drive Automatic Control System	48	3	36	12		考试 Exam	7	
SS040037	计算机与科学计算问题 Computer and Science Computing	16	1	16			考查 Term Paper	7	
总计 Total		368	23	256	112				选修 6 学分以上

6、课程实践 (Course Practice): 22 周 +160 学时 (22 weeks and 160 hours), 26 学分 (26 Credits)

课程代码 Course Code	课程名称 Course Name	周数 (学时) Week(hour)	学分 Credits	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	1	考查 Term Paper	1	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考试 Exam	1 夏	
PR191045	实验物理 (1) Physics Experiments (1)	24 学时	1	考试 Exam	2	
PR192046	实验物理 (2) Physics Experiments (2)	24 学时	1	考试 Exam	3	
PR042099	电路实验 Circuit Experiments	16 学时	1	考查 Term Paper	2	
PR043104	数字电子技术实验 Digital Electronics Technique Experiments	16 学时	1	考查 Term Paper	3	
PR042100	模拟电子技术实验 Analog Electronics Technique Experiments	16 学时	1	考查 Term Paper	3	
PR042101	电机与拖动实验 Experiments of Electric Machinery and Drive	16 学时	1	考查 Term Paper	4	
PR042102	传感器原理课程设计 Principle of Transducers Course Design	16 学时	1	考查 Term Paper	4	
PR042127	电子工艺实习 Practice of Electronic Techniques	4 周	4	考查 Term Paper	2 夏	
PR043106	电力系统分析实验 Experiments of Power System Analysis	16 学时	1	考查 Term Paper	5	
PR043110	电力电子技术课程设计 Power Electronics Technology Course Design	16 学时	1	考查 Term Paper	5	
PR043218	专业实习 Professional Practice	4 周	4	考查 Term Paper	3 夏	
PR044113	毕业设计 (论文) Graduation Design (Thesis)	12 周	6	考查 Term Paper	8	
总计 Total		22 周 +160 学时	26			

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.

电子信息工程专业培养方案

一、专业培养目标

本专业面向信息技术产业需求,培养德、智、体、美、劳全面发展,具有道德文化素养、社会责任感、创新精神和创业意识,掌握电子信息工程专业基本理论知识,具备良好学习能力、实践能力、专业能力和一定的创新创业能力,毕业后可在电子信息及相关领域从事系统、设备、器件的研究、设计、开发、制造、应用、维护、管理等工作的高素质专门人才。毕业生经过五年的实际工作,具备独立从事系统设计、软硬件开发、信息处理等工作的能力。

二、毕业要求

- (1) 掌握在电子信息领域从事科学研究、工程开发与设计所需要的数学、自然科学等基础知识。
- (2) 掌握电子电路、信号处理、电磁场、计算机基本理论与技术,具有系统的电子信息领域工程实践或科研训练经历,了解电子信息领域的发展现状和趋势。
- (3) 能够熟练使用常用电子仪器仪表,初步具备设计与实施电子信息领域工程实验的能力,并能够对实验结果进行分析,具有分析、提出方案并解决电子信息领域工程问题的能力,可参与相关系统的设计、运行与维护。
- (4) 具有创新精神和创业意识,初步具备电子信息领域中综合类实践、实验独立设计、分析和调试能力以及进行产品开发与设计、技术改造与创新、工程设计与分析等解决实际工程问题的能力。
- (5) 掌握文献检索、资料查询及运用现代信息技术获取相关信息的基本方法,具备科技论文写作基本能力。
- (6) 具有一定的组织管理能力、表达能力和人际交往能力以及良好的团队协作精神。
- (7) 掌握一门外语,能阅读本专业外文资料,具有一定的国际视野和跨文化交流能力。
- (8) 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。

三、主干学科

信息与通信工程、电子科学与技术。

四、学制与学位

学制四年。学生修满规定的最低毕业学分,达到毕业要求后,授予工学学士学位。

五、核心课程

专业核心课程: 数字信号处理、高频电子线路、电子测量原理、数字电路与系统设计、信息论基础、通信原理、数字图像处理、可编程片上系统、电子信息工程专业英语。

实践教学: 电路实验、模拟电子技术实验、数字电子技术实验、ACM 编程实习、面向对象编程实践、电学仿真软件实践、电子测量与电路设计、电子电路课程设计、专业实习、毕业设计(论文)。

Undergraduate Program in Electronics and Information Engineering

1. Academic Objectives

This major is oriented to the needs of the information technology industry, and aims at cultivating high-quality professionals engaged in the research, design, development, manufacturing, application, maintenance and management of systems, equipment and devices in electronic information and related fields after graduation. Students, who have moral and cultural literacy, social responsibility, innovative spirit and entrepreneurial consciousness with an all-round development of morality, intelligence, physical education, beauty and labor, master the basic theoretical knowledge of electronic information engineering, and have good learning ability, practical ability, professional ability and a certain ability of innovation and entrepreneurship. After five years of practical work, the graduates have the ability to independently engage in system design, software and hardware development, information processing and other works.

2. Graduation Requirements

(1) Master basic knowledge of mathematics and natural science for scientific research, engineering development and design in the field of electronic information.

(2) Master basic theory and technology of electronic circuit, signal processing, electromagnetic field and computer. Have systematic engineering practice or scientific research training experience in electronic information field. Understand the development status and trend of electronic information field.

(3) Be proficient in the use of commonly used electronic instruments. Have preliminary ability to design and implement engineering experiments in the field of electronic information, and to analyze the experimental results. Have the ability to analyze engineering problems, propose solutions and solve problems in the field of electronic information. Be able to participate in the design, operation and maintenance of related systems.

(4) Have the spirit of innovation and entrepreneurial consciousness. Have preliminary ability to independently design comprehensive practice and experiments in electronic information field, and can implement analysis and debugging. Have preliminary ability to carry out product development and design, technical transformation and innovation, engineering design and analysis, etc., to solve practical engineering problems.

(5) Master basic methods of literature retrieval, data inquiry and obtaining relevant information by using modern information technology. Have basic ability of writing scientific and technological papers.

(6) Have certain organization management ability, expression ability and interpersonal communication ability as well as good team cooperation spirit.

(7) Master a foreign language. Be able to read foreign language materials of this major. Have a certain international vision and cross-cultural communication ability.

(8) Have the consciousness of independent learning and lifelong learning, and have the ability to continuously learn and adapt to development.

3. Main disciplines

Information and Communication Engineering, Electronic Science and Technology.

4. Length of Schooling and Degree

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.

5. Core Courses

Specialized Core Courses: Digital Signal Processing, High Frequency Electronic Circuit, Measurement and Instrumentation Principles, Digital Circuit and System Design, Elements of Information Theory, Communication Principles, Digital Image Processing, System on Programmable Chip, Special English for Electronic Information Engineering.

Practical Teaching: Circuit Experiments, Analog Electronic Technology Experiments, Digital Electronic Technology Experiments, ACM Programming Practice, Object-oriented Programming Practices, Practice of Electrical Simulation Software, Electronic Measurement and Circuit Design, Advanced Labs in Electric Circuit, Professional Practice, Graduation Design (Thesis).

六、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	730	40	11	13		4	5	1	3	1			2
	通识教育选修课程 Selective Courses of General Education	192	12											
	学科基础课程 Disciplinary Fundamental Courses	888	55.5	9	13		14.5	17		2				
专业教育 Professional Education	专业核心课程 Specialized Fundamental Courses	384	24					3		10	9		2	
	专业拓展课程 Specialized Development	64	4											
实践教育 Practical Education	课程实践 Course Practice	24 周 +176 学 时	30		2	4	5		6	3		4		6
	课外实践 Extracurricular practice		6											
必修课总学分 Required course credits				149.5										
选修课总学分 Elective course credits				22										
最低毕业总学分 Total Credits				171.5										

七、课程设置 (Curriculum)

1、通识教育必修课程 (Required Courses of General Education): 730 学时 (730 Hours), 41 学分 (41 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
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	
GR183004	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	64	4	48	16		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	

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
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	
GR303006	大学生心理素质教育 (2) Mental Health (2)	16	1	16			考查 Term Paper	5	
GR302008	军事理论 Military Theory	36	1	36			考查 Term Paper	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)	32	1		32		考试 Exam	1	
GR141006	体育 (2) (系列课程) Physical Education(2)	32	1		32		考试 Exam	2	
GR142007	体育 (3) (系列课程) Physical Education(3)	32	1		32		考试 Exam	3	
GR142008	体育 (4) (系列课程) Physical Education (4)	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	10	12	10	考试 Exam	1	
GR041003	程序设计基础 A Fundamentals of Programming A	64	4	24	24	16	考试 Exam	2	
总计 Total		730	41	486	218	26			

2、通识教育选修 (Selective Courses of General Education): 192 学时 (192Hours), 12 学分 (12 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	7	考查 Term Paper	2-8	4 个类别中选修 7 个学分, 其中,《大学生安全教育》(1 学分) 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	
3	自然文化类 Natural Culture Courses	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	5-8	
5	创新创业教育类 (含在线课程) Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5	3	考查 Term Paper	2-8	选修 3 个学分, 其中《新生研讨课》(1 学分) 必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 6	2	考查 Term Paper	2-4	
总计 Total			12			

3、学科基础课程 (Disciplinary Fundamental Courses): 888 学时 (888 Hours), 55.5 学分 (55.5 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR191001	高等数学 A (1) Advanced Mathematics A(1)	96	6	96			考试 Exam	1	
DR021002	工程图学 Engineering Graphics	48	3	40	8		考试 Exam	1	
DR191008	大学物理 (1) College Physics (1)	48	3	48			考试 Exam	2	
DR191002	高等数学 A (2) Advanced Mathematics A(2)	96	6	96			考试 Exam	2	
DR042079	电路分析基础 Fundamentals of Circuit Analysis	48	3	48			考试 Exam	2	
IS040013	电子信息工程专业导论 Introduction to Electronic Information Engineering	16	1	16			考查 Term Paper	2	
DR192009	大学物理 (2) College Physics (2)	48	3	48			考试 Exam	3	
DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192018	复变函数与积分变换 Complex Variable Functions and Integral Transformations	48	3	48			考试 Exam	3	

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
DR042207	模拟电子技术 Analog Electronic Technology	56	3.5	56			考试 Exam	3	
DR043084	数字电子技术 Digital Electronic Technology	48	3	48			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistics	48	3	48			考试 Exam	4	
DR102131	单片机原理及接口技术 Principle and Interface Technology of Microcontrollers	64	4	48	16		考试 Exam	4	
DR042033	数据结构基础 Data Structures	48	3	32	16		考试 Exam	4	
DR102132	信号与系统 Signal and Systems	64	4	56	8		考试 Exam	4	
DR102006	电磁场理论 Fields of Electromagnetism	48	3	48			考试 Exam	4	
DR043114	随机过程 Stochastic Processes	32	2	32			考试 Exam	5	
总计 Total		888	55.5	840	48				

4、专业核心课程 (Specialized Core Courses): 384 学时 (384 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
SR043115	高频电子线路 High Frequency Electronic Circuit	48	3	42	6		考试 Exam	4	
DR103133	数字信号处理 C Digital Signal Processing C	64	4	56	8		考试 Exam	5	
SR103028	电子测量原理 Measurement and Instrumentation Principles	48	3	36	12		考试 Exam	5	
DR103134	数字电路与系统设计 Digital Circuit and System Design	48	3	18	30		考试 Exam	5	
SR043220	信息论基础 Elements of Information Theory	16	1	16			考查 Term Paper	6	
SR043116	通信原理 Communication Principles	48	3	38	10		考试 Exam	6	
SR103034	可编程片上系统 System on Programmable Chip	32	2	16	16		考查 Term Paper	6	
SR044119	数字图像处理 Digital Image Processing	48	3	32	16		考试 Exam	6	双语
SR044120	电子信息工程专业英语 Special English for Electronic Information Engineering	32	2	32			考查 Term Paper	7	
总计 Total		384	24	286	98				

5、专业拓展课程 (Specialized Development Courses): 208 学时 (208 Hours), 13 学分 (13 Credits), 要求最低选修 4 学分 (4 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SR103031	新型单片机应用与实践 Application and Practice of New MCU	32	2	8	24		考查 Term Paper	5	
DR042007	计算机网络 Computer Network	48	3	40	8		考试 Exam	6	
SS043216	人工智能原理 Principles of Artificial Intelligence	32	2	24	8		考试 Exam	6	
SR042088	数据挖掘技术 Data Mining Technology	32	2	32			考查 Term Paper	6	
SR043208	自动控制原理 Principle of Automatic Control	48	3	48			考试 Exam	7	
SS044221	电子信息新技术实践 Practice of new electronic information technologies	16	1	12	4		考查 Term Paper	7	
总计 Total		208	13	164	44				

6、课程实践 (Course Practice): 24 周 +176 学时 (24 weeks and 176 hours), 29 学分 (29 Credits)

课程代码 Course Code	课程名称 Course Name	周数 (学时) Week(hour)	学分 Credits	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	1	考查 Term Paper	1	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考试 Exam	1 夏	
PR191045	实验物理 (1) Physics Experiments (1)	24 学时	1	考试 Exam	2	
PR042099	电路实验 Circuit Experiments	16 学时	1	考查 Term Paper	2	
PR041222	ACM 编程实习 ACM Practices	2 周	2	考查 Term Paper	1 夏	

课程代码 Course Code	课程名称 Course Name	周数(学时) Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR192046	实验物理(2) Physics Experiments (2)	24 学时	1	考试 Exam	3	
PR042100	模拟电子技术实验 Analog Electronic Technology Experiments	16 学时	1	考查 Term Paper	3	
PR043104	数字电子技术实验 Digital Electronic Technology Experiments	16 学时	1	考查 Term Paper	3	
PR042125	面向对象编程实践 Object-oriented Programming Practices	32 学时	2	考查 Term Paper	3	
PR042121	电子测量与电路设计 Electronic Measurement and Circuit Design	4 周	4	考查 Term Paper	2 夏	
PR043213	电学仿真软件实践 Practice of Electrical Simulation Software	32 学时	2	考查 Term Paper	5	
PR043223	电子电路课程设计 Advanced Labs in Electric Circuit	16 学时	1	考查 Term Paper	5	
PR043122	专业实习 Professional Practice	4 周	4	考查 Term Paper	3 夏	
PR044123	毕业设计(论文) Graduation Design (Thesis)	12 周	6	考查 Term Paper	8	
总计 Total		24 周 +176 学时	29			

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.

人工智能专业培养方案

一、专业培养目标

本专业面向国家人工智能源头创新需求，围绕人工智能关键技术难题，培养德、智、体、美、劳全面发展，具有健全人格和良好职业素质，具有扎实的数理科学基础知识，掌握人工智能领域坚实的基础理论和宽广的专业知识；掌握解决工程问题的先进技术方法和现代技术手段；具有创新意识和独立担负科学技术或工程管理工作的能力；能够快速学习人工智能前沿技术、能够利用人工智能技术解决实际问题、能够研究并开拓人工智能新边界。成为可以从事人工智能系统相关的研究、开发、部署与应用等领域工作创新型、复合型和工程化的高级专门人才。

毕业后能从事人工智能行业和领域的科学技术研究、系统设计和应用开发等工作，并可继续攻读人工智能及相关学科的硕士和博士学位。

预期毕业五年以上的毕业生：

- (1) 理解并坚守职业道德规范，具有社会责任感，有意愿并有能力服务社会。
- (2) 能在工业界、学术界成功评估、分析、解决与专业职位相关的工程问题。
- (3) 能够适应独立和团队工作环境，具备与业界同行和社会公众进行有效沟通的能力。
- (4) 能以重要的法律、伦理、社会、环境、网络安全等方面宽广的系统视角管理与专业职位相关的多学科项目。
- (5) 具有全球化意识和国际视野，拥有终生的学习习惯和能力。

二、毕业要求

结合培养目标和本专业特色，制定本专业的 12 条毕业要求：

(1) 工程知识：具备完整的人工智能专业知识结构，表现为良好的算法能力、系统能力、人工智能应用能力以及和其他学科的融合及创新能力；具有扎实的工程基础知识和实践能力。

(2) 问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达，并通过文献研究和建模分析人工智能相关领域的复杂工程问题，以获得有效结论。

(3) 设计 / 开发解决方案：能够设计针对人工智能相关领域复杂工程问题的解决方案，设计满足特定需求的系统或原型，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) 研究能力：掌握科学思维方法和科学研究方法；具备求实创新意识和严谨的科学素养；能够基于科学原理并采用科学方法对人工智能相关领域的复杂工程问题进行研究，包括设计实验、分析和解释数据，并通过信息综合得到合理有效的结论。

(5) 使用现代工具：能够针对人工智能相关领域的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，在理解相关工具的特点及局限性基础上，进行模拟、系统开发和测试，并对实验结果进行分析评估。

(6) 工程与社会：能够基于工程背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

(7) 环境和可持续发展：熟悉环境保护和可持续发展等方面的方针、政策和法律、法规，能够理解和评价针对人工智能相关领域复杂工程问题及其工程实践对环境、社会可持续发展的影响。

(8) 职业规范：具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德、规范及行业标准，履行责任。

（9）个人和团队：具有一定的文学艺术修养和现代意识，具有国际视野和跨文化的交流、竞争与合作能力。参与团队工程项目训练，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。

（10）沟通：能够就人工智能相关领域的复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写技术报告和设计文稿、陈述发言、清晰表达或回应指令，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。

（11）项目管理：具有较强的表达能力和人际交往能力以及在团队中发挥作用的能力。具有团队项目经验，理解并掌握工程管理原理与经济决策方法，并能在多学科环境中应用。

（12）终身学习：具有自主学习和终身学习的意识，掌握文献检索、资料查询及其他手段获取相关信息的基本方法；有不断学习和适应发展的能力。

三、主干学科

人工智能。

四、学制与学位

学制四年。学生修满规定的最低毕业学分，达到毕业要求后，授予工学学士学位。

五、核心课程

专业核心课程：人工智能原理、智能计算、模式识别、知识工程与知识图谱、计算机视觉、机器人导论、数据库原理、面向对象软件设计、软件工程等

实践课程：C++ 程序设计、数据结构、机器人、机器学习 4 门课程配套的课程设计，1 夏、2 夏、3 夏的综合实践与企业实训课程，第 8 学期的毕业设计。

Undergraduate Program in Artificial Intelligence (AI)

1. Academic Objectives

This major is oriented to the innovation needs of the national artificial intelligence source, focusing on the key technical problems of artificial intelligence, cultivating the comprehensive development of morality, intelligence, physical, beauty and labor, with a sound personality and good professional qualities, with a solid basic knowledge of mathematics and science, and mastering the field of artificial intelligence Solid basic theories and broad professional knowledge; master advanced technical methods and modern technical means to solve engineering problems; have a sense of innovation and the ability to independently undertake science and technology or engineering management; be able to quickly learn cutting-edge artificial intelligence technology and be able to use artificial intelligence Technology solves practical problems, can study and open up new boundaries of artificial intelligence. Become an innovative, compound and engineering senior professional who can be engaged in the research, development, deployment and application of artificial intelligence systems.

After graduation, students can work in science and technology research, system design and application development. They can also continue to pursue their master's and doctoral degrees in artificial intelligence and related disciplines.

The students in five years after graduation will have the following abilities.

- (1) Understand and persist to professional ethics, have a sense of social responsibility, have the ability to serve the society.
- (2) Successfully evaluate, analyze, and solve engineering problems related to professional positions in industry and academia.
- (3) Be able to adapt to independent and team work environments, and have the ability to communicate effectively with industry peers and the public.
- (4) Be able to manage multidisciplinary projects with a broad systemic perspective.
- (5) Have a sense of globalization and international vision, lifelong learning habits and abilities, and strong workplace competitiveness in the computer field.

2. Graduation Requirements

Combine the training objectives with the characteristics of this major, the 12 graduation requirements of this major are as follows.

- (1) Engineering Knowledge: With a complete artificial intelligence knowledge, which is specifically good the algorithm ability, system ability, artificial intelligence application ability and integration with other disciplines and innovative application ability; have solid engineering basic knowledge and practical ability.
- (2) Problem Analysis: Students can neatly use the basic principles of mathematics, natural sciences, and engineering science. Then can also research and analyze the complex engineering problems related to artificial intelligence by literature research.
- (3) Design/Development Solution: Students have the ability to design solutions of complex engineering problems in computer science fields and design prototype system to meet specific needs. In these design process, they should take into account social, health, safety, legal, cultural, and environmental factors.
- (4) Research Ability: have good mathematical ability and a solid foundation of computer professional knowledge; master solid basic theories and professional knowledge of artificial intelligence, Students can adopt science methods to study for complex engineering problems in artificial intelligence fields. According to designing experiments and analyzing experimental results, students can obtain reasonable conclusion.
- (5) Using Modern Tools: During solving complex engineering problems, students can develop and

utilize modern tools.

(6) Engineering and Society: Based on engineering background knowledge, students can evaluate the impact of professional engineering practice and complex engineering problem solutions for society, health, safety, law and culture.

(7) Environment and Sustainable Development: understand the laws and regulations related to product development, production, and design related to this major, and be familiar with the policies of environmental protection and sustainable development, Policies, laws and regulations. Students can understand and evaluate the impact of complex engineering problems and their engineering practices for environmental and social sustainability.

(8) Professional Norms: With humanities and social science literacy and social responsibility, students can understand and obey engineering ethics, norms and industry standards in engineering practice.

(9) Individual and Team: Have a certain degree of literary and artistic accomplishment and modern awareness, have an international vision and the ability of cross-cultural communication, competition and cooperation. Students can assume the roles of individual, team member, and responsible individual in a multidisciplinary team.

(10)Communication: Students can effectively communicate with industry peers and the public on complex engineering issues in artificial intelligence related fields. They can also write technical reports, have a certain international perspective, and communicate in a cross-cultural context.

(11)Project Management: have strong expression skills and interpersonal skills, and the ability to play a role in a team, students have the experience of team projects, understand and master engineering management principles and economic decision-making methods, and apply them in a multidisciplinary environment.

(12)Life-Long Learning: Students have the consciousness of independent learning and lifelong learning, master the basic methods of obtaining relevant information through literature retrieval, and have the ability to continuously learn and adapt to society development.

3. Main disciplines

Artificial Intelligence.

4. Length of Schooling and Degree

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

5. Core Courses

Specialized core courses: principles of artificial intelligence, intelligent computation, pattern recognition, knowledge engineering and knowledge graphs, computer vision, robotics, principles of database systems, object-oriented software design, software engineering, etc.

Practice courses: comprehensive courses design including C++ program design, data structure, robotics, machine learning. Course of the first, second and third summer integrated application of practical courses, semester's graduation design of eighth semester.

六、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	634	34	9	9		4	5	1	3	1			2	
	通识教育选修课程 Selective Courses of General Education	192	12	1											
专业教育 Professional Education	学科基础课程 Disciplinary Fundamental Courses	896	56	10	12		16	9		6	3				
	专业核心课程 Specialized Fundamental Courses	384	24					3		9	8		4		
	专业拓展课程 Specialized Development	80	5												
实践教育 Practical Education	课程实践 Course Practice	32 周 +64 学 时	31		1	6	4	2	4	2	2	4		6	
	课外实践 Extracurricular practice		6												
必修课总学分 Required course credits				145											
选修课总学分 Elective course credits				23											
最低毕业总学分 Total Credits				168											

七、课程设置 (Curriculum)

1、通识教育必修课程 (Required Courses of General Education): 634 学时 (634 Hours), 35 学分 (35 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
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	
GR183004	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	64	4	48	16		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	

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
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	
GR303006	大学生心理素质教育 (2) Mental Health (2)	16	1	16			考查 Term Paper	5	
GR302008	军事理论 Military Theory	36	1	36			考查 Term Paper	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)	32	1		32		考试 Exam	1	
GR141006	体育 (2) (系列课程) Physical Education (2)	32	1		32		考试 Exam	2	
GR142007	体育 (3) (系列课程) Physical Education (3)	32	1		32		考试 Exam	3	
GR142008	体育 (4) (系列课程) Physical Education (4)	32	1		32		考试 Exam	4	
总计 Total		634	35	452	182	26			

2、通识教育选修 (Selective Courses of General Education): 192 学时 (192Hours), 12 学分 (12 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	7	考查 Term Paper	2-8	4 个类别中选修 7 个学分, 其中,《大学生安全教育》(1 学分) 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	
3	自然文化类 Natural Culture Courses	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	5-8	
5	创新创业教育类 (含在线课程) Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5	3	考查 Term Paper	2-8	选修 3 个学分, 其中《新生研讨课》(1 学分) 必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 6	2	考查 Term Paper	2-4	
总计 Total			12			

3、学科基础课程 (Disciplinary Fundamental Courses): 896 学时 (896 Hours), 56 学分 (56 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
IS041225	人工智能专业导论 Introduction to professional	16	1	16			考查 Term Paper	1	
DR191001	高等数学 A (1) Advanced Mathematics A(1)	96	6	96			考试 Exam	1	
DR191002	高等数学 A (2) Advanced Mathematics A(2)	96	6	96			考试 Exam	2	
DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistic	48	3	48			考试 Exam	4	
SR193104	数值分析 Numerical Analysis	48	3	48			考试 Exam	5	
DR191008	大学物理 (1) College Physics (1)	48	3	48			考试 Exam	2	
DR192009	大学物理 (2) College Physics (2)	48	3	48			考试 Exam	3	
DR043084	数字电子技术 Digital Electronics Technique	48	3	48			考试 Exam	3	

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
DR041226	程序设计基础 C Fundamental of Programming C	48	3	32		16	考试 Exam	1	
DR042227	离散数学 Discrete Mathematics	48	3	48			考试 Exam	3	
DR042004	C++ 程序设计 C++ Programming	48	3	30		18	考试 Exam	2	
DR042228	微机原理与汇编语言 Microcomputer Principle and Assembly Language	32	2	22		10	考试 Exam	3	
DR042006	数据结构 Data Structures	48	3	48			考试 Exam	3	
DR042007	计算机网络 Computer Networks	48	3	40		8	考试 Exam	4	
DR043008	计算机组成与体系结构 Computer Organization and Architecture	48	3	32		16	考试 Exam	4	
DR043010	操作系统原理 The Principle of Operating Systems	48	3	48			考试 Exam	5	
DR043229	计算机视觉 Computer Vision	48	3	36		12	考试 Exam	6	
总计 Total		896	56	832		80			

4、专业核心课程 (Specialized Core Courses): 384 学时 (384 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
SR043280	面向对象软件设计 Object-Oriented Software Design	48	3	32		16	考试 Exam	5	
SR043230	机器人导论 Robotics	48	3	32		16	考试 Exam	5	
SR043231	模式识别 Pattern recognition	48	3	32		16	考试 Exam	5	
SR043281	软件工程导论 Software Engineering	48	3	32		16	考查 Term Paper	6	
SR043233	知识工程与知识图谱 Knowledge Engineering and Knowledge Graph	48	3	32		16	考试 Exam	6	
SR043017	数据库原理 Principles of Database Systems	48	3	48			考试 Exam	4	
SS043216	人工智能原理 Principles of Artificial Intelligence	32	2	24		8	考试 Exam	6	
SR044234	智能计算 Intelligent Computation	48	3	32		16	考试 Exam	7	
SR044235	人工智能学科前沿课 Discipline Frontiers	16	1	16			考查 Term Paper	7	
总计 Total		384	24	280		104			

5、专业拓展课程 (Specialized Development Courses): 80 学时 (80 Hours), 5 学分 (5 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SS043236	大数据技术 Big data technology	32	2	20		12	考查 Term Paper	5	
SS043237	机器学习 Machine learning	32	2	20		12	考查 Term Paper	6	
SS044238	人工智能伦理 Artificial Intelligence Ethics	16	1	16			考查 Term Paper	7	
总计 Total		80	5	56		24			

6、课程实践 (Course Practice): 32 周 +64 学时 (32 weeks and 64 hours), 31 学分 (31 Credits)

课程代码 Course Code	课程名称 Course Name	周数 (学时) Week(hour)	学分 Credits	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	1	考查 Term Paper	1	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考试 Exam	1 夏	
PR191045	实验物理 (1) Physics Experiments (1)	24 学时	1	考试 Exam	2	
PR192046	实验物理 (2) Physics Experiments (2)	24 学时	1	考试 Exam	3	
PR043104	数字电子技术实验 Digital Electronics Technique Experiments	16 学时	1	考查 Term Paper	3	
PR042023	C++ 程序设计课程设计 C++ Programming Course Design	2 周	2	考查 Term Paper	1 夏	
PR042024	数据结构课程设计 Data Structures Course Design	2 周	2	考查 Term Paper	3	
PR043239	机器学习课程设计 Machine Learning Course Design	2 周	2	考查 Term Paper	6	

课程代码 Course Code	课程名称 Course Name	周数 (学时) Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR043272	机器人课程设计 Robotics Course Design	2 周	2	考查 Term Paper	5	
PR041283	计算机基础实习 Computer Basic Practice	2 周	2	考查 Term Paper	1 夏	
PR042284	计算机系统实习 Computer System Practice	4 周	4	考查 Term Paper	2 夏	
PR043286	人工智能综合实习 AI Comprehensive Practice	4 周	4	考查 Term Paper	3 夏	
PR044245	毕业设计 (论文) Graduation Design (Thesis)	12 周	6	考查 Term Paper	8	
总计 Total		32 周 +64 学时	31			

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.

八、毕业要求与培养目标矩阵

毕业要求	培养目标				
	目标 1	目标 2	目标 3	目标 4	目标 5
工程知识		√			
问题分析		√			
设计 / 开发解决方案		√		√	
研究能力		√		√	√
使用现代工具		√			
工程与社会	√		√		
环境和可持续发展	√				√
职业规范	√				
个人与团队				√	
沟通			√	√	√
项目管理			√	√	
终身学习		√			√

九、课程与毕业要求关系矩阵

课程名称 \ 毕业要求	(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
思想道德与法治			M			M	M					
大学生心理素质教育			L					M				
中国近现代史纲要								L				
马克思主义基本原理							M	M			L	
毛泽东思想和中国特色社会主义理论体系概论							M	M				
习近平新时代中国特色社会主义思想概论							M	M				
形势与政策								H			L	
大学英语										M		
大学英语素质拓展										L		
大学生职业生涯规划与就业指导			L					M				M
高等数学 A	H	L										
线性代数	M											
概率论与数理统计	M											
数值分析	M	M		M								
大学物理	H			L								
数字电子技术	H			L								
离散数学	L	M										
人工智能专业导论					L							M
程序设计基础 C	M				M					M		
C++ 程序设计	M				M							
微机原理与汇编语言	M				L							
数据结构		M										
计算机网络	M			M		H						
计算机组成与体系结构	M			M								
操作系统原理	M			L								L

课程名称	毕业要求	(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
模式识别		M			M								
面向对象分析与设计										M			
机器人导论				M									
知识工程与知识图谱			M	L									
计算机视觉			L		L								
软件工程导论										M	L	H	
数据库原理	M				M								
大数据技术				H			H						
智能计算					L	M							
人工智能原理			L		L	L					L		
机器学习						H							
人工智能专业新生研讨课													
人工智能学科前沿课				L							L		M
人工智能伦理									H	L			
实验物理	M				M								
数字电子技术实验	M			L	M								
C++ 程序设计课程设计				M		M							
数据结构课程设计				H									
操作系统课程设计				M		M							
机器学习课程设计				M		M							
机器人课程设计				M		L							
计算机基础实习	M					M							
计算机系统实习						H							L
人工智能综合实习				M	M								
毕业设计				H		H		M		M	H	H	M
军事技能									L	L			
军事理论									L				
思想政治社会实践									M				
课外实践							L	M	L	H		M	L

注：H 表示课程对毕业要求指标支撑度高；M 表示课程对毕业要求指标支撑度中等；L 表示课程对毕业要求指标支撑度低。

计算机科学与技术专业培养方案

一、专业培养目标

本专业贯彻落实党和国家的教育方针，坚持立德树人，根据社会经济发展和国家战略需求，培养遵守法律法规，具有良好的道德与修养，具有社会和环境意识，掌握计算机科学与技术学科的基础理论、专业知识及基本技能，具备分析和解决本领域复杂工程问题的能力，具有良好的沟通能力和外语应用能力，具有创新意识、团队合作精神和国际化视野，能适应科学技术发展和社会需求的计算机科学与技术高级专门人才。

毕业后能从事计算机行业和领域的科学技术研究、系统设计和应用开发等工作，并可继续攻读计算机科学与技术及相关学科的硕士和博士学位。

预期毕业五年以上的毕业生：

- (1) 理解并坚守职业道德规范，具有社会责任感，有意愿并有能力服务社会。
- (2) 能在工业界、学术界成功评估、分析、解决与专业职位相关的工程问题。
- (3) 能够适应独立和团队工作环境，具备与业界同行和社会公众进行有效沟通的能力。
- (4) 能以重要的法律、伦理、社会、环境、网络安全和经济等方面宽广的系统视角管理与专业职位相关的多学科项目。
- (5) 具有全球化意识和国际视野，拥有终生的学习习惯和能力，在计算机领域具有较强的职场竞争力。

二、毕业要求

结合培养目标和本专业特色，制定本专业的 12 条毕业要求：

- (1) 工程知识：具备完整的计算机科学与技术知识结构，能将数学、自然科学、工程基础和专业用于解决计算机科学与技术相关领域的复杂工程问题。
- (2) 问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达，并通过文献研究和建模分析计算机科学与技术相关领域的复杂工程问题，以获得有效结论。
- (3) 设计 / 开发解决方案：能够设计针对计算机科学与技术相关领域复杂工程问题的解决方案，设计满足特定需求的系统或原型，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) 研究能力：能够基于科学原理并采用科学方法对计算机科学与技术相关领域的复杂工程问题进行研究，包括设计实验、分析和解释数据，并通过信息综合得到合理有效的结论。
- (5) 使用现代工具：能够针对计算机科学与技术相关领域的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，在理解相关工具的特点及局限性基础上，进行模拟、系统开发和测试，并对实验结果进行分析评估。
- (6) 工程与社会：能够基于工程背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。
- (7) 环境和可持续发展：能够理解和评价针对计算机科学与技术相关领域复杂工程问题及其工程实践对环境、社会可持续发展的影响。
- (8) 职业规范：具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德、规范及行业标准，履行责任。
- (9) 个人和团队：参与团队工程项目训练，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。

（10）沟通：能够就计算机科学与技术相关领域的复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写技术报告和设计文稿、陈述发言、清晰表达或回应指令，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。

（11）项目管理：具有团队项目经验，理解并掌握工程管理原理与经济决策方法，并能在多学科环境中应用。

（12）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。

三、主干学科

计算机科学与技术。

四、学制与学位

学制四年。学生修满规定的最低毕业学分，达到毕业要求后，授予工学学士学位。

五、核心课程

专业核心课程：数据库原理、编译原理、面向对象软件设计、软件工程、计算机图形学、计算机安全等。

实践类课程：C++ 程序设计、数据结构、操作系统、编译原理 4 门课程配套的课程设计，1 夏、2 夏、3 夏的综合实践课程，第 8 学期的毕业设计。

Undergraduate Program in Computer Science and Technology

1. Academic Objectives

This major implements the education policy of the Communist Party and China, insists on cultivating morality and cultivating people according to the needs of social and economic development and national strategy, cultivates compliance with laws and regulations, has good morals and culture, has social and environmental awareness, and masters computer science and technology the basic theories, professional knowledge and basic skills, the ability to analyze and solve complex engineering problems in this field, good communication skills and foreign language application skills, innovative awareness, teamwork spirit and international vision, can adapt to the development of science and technology senior professionals in computer science and technology who meet the needs of society.

After graduation, students can work in science and technology research, system design and application development. They can also continue to pursue their master's and doctoral degrees in computer science and technology and related disciplines.

The students in five years after graduation will have the following abilities.

(1) Understand and persist to professional ethics, have a sense of social responsibility, have the ability to serve the society.

(2) Successfully evaluate, analyze, and solve engineering problems related to professional positions in industry and academia.

(3) Be able to adapt to independent and team work environments, and have the ability to communicate effectively with industry peers and the public.

(4) Be able to manage multidisciplinary projects with a broad systemic perspective.

(5) Have a sense of globalization and international vision, lifelong learning habits and abilities, and strong workplace competitiveness in the computer field.

2. Graduation Requirements

Combine the training objectives with the characteristics of this major, the 12 graduation requirements of this major are as follows.

(1) Engineering Knowledge: With a complete computer science and technology knowledge, students can use mathematics, natural science, engineering foundation and professional knowledge to solve complex engineering problems in related fields.

(2) Problem Analysis: Students can neatly use the basic principles of mathematics, natural sciences, and engineering science. Then can also research and analyze the complex engineering problems related to computer science and technology by literature research.

(3) Design/Development Solution: Students have the ability to design solutions of complex engineering problems in computer science fields and design prototype system to meet specific needs. In these design process, they should take into account social, health, safety, legal, cultural, and environmental factors.

(4) Research Ability: Students can adopt science methods to study for complex engineering problems in computer science and technology fields. According to designing experiments and analyzing experimental results, students can obtain reasonable conclusion.

(5) Using Modern Tools: During solving complex engineering problems, students can develop and

utilize modern tools.

(6)Engineering and Society: Based on engineering background knowledge, students can evaluate the impact of professional engineering practice and complex engineering problem solutions for society, health, safety, law and culture.

(7)Environment and Sustainable Development: Students can understand and evaluate the impact of complex engineering problems and their engineering practices for environmental and social sustainability.

(8)Professional Norms: With humanities and social science literacy and social responsibility, students can understand and obey engineering ethics, norms and industry standards in engineering practice.

(9)Individual and Team: Students can assume the roles of individual, team member, and responsible individual in a multidisciplinary team.

(10)Communication: Students can effectively communicate with industry peers and the public on complex engineering issues in computer science and technology related fields. They can also write technical reports, have a certain international perspective, and communicate in a cross-cultural context.

(11)Project Management: Students have the experience of team projects, understand and master engineering management principles and economic decision-making methods, and apply them in a multidisciplinary environment.

(12)Life-Long Learning: Students have the consciousness of independent learning and lifelong learning, and have the ability to continuously learn and adapt to society development.

3. Main disciplines

Computer Science and Technology.

4. Length of Schooling and Degree

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

5. Core Courses

Professional core courses: principle of database, principles of compilers, object-oriented software design, software engineering, computer graphics, artificial intelligence, computer security, etc.

Practice courses: comprehensive courses design including C++ programming, data structure, operating system and principles of compilers. Course of the first, second and third summer integrated application of practical courses, semester's graduation design of eighth semester.

六、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	634	35	9	9		4	5	1	3	1			2
	通识教育选修课程 Selective Courses of General Education	192	12											
	学科基础课程 Disciplinary Fundamental Courses	848	53	10	12		16	9		6				
专业教育 Professional Education	专业核心课程 Specialized Fundamental Courses	326	21					3		6	12			
	专业拓展课程 Specialized Development	112	7											
实践教育 Practical Education	课程实践 Course Practice	32 周 +64 学 时	31		1	8	4		4	2	2	4		6
	课外实践 Extracurricular practice	—	6											
必修课总学分 Required course credits				139										
选修课总学分 Elective course credits				25										
最低毕业总学分 Total Credits				164										

七、课程设置 (Curriculum)

1、通识教育必修课程 (Required Courses of General Education): 634 学时 (634 Hours), 35 学分 (35 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
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	
GR183004	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	64	4	48	16		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	

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
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	
GR303006	大学生心理素质教育 (2) Mental Health (2)	16	1	16			考查 Term Paper	5	
GR302008	军事理论 Military Theory	36	1	36			考查 Term Paper	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)	32	1		32		考试 Exam	1	
GR141006	体育 (2) (系列课程) Physical Education (2)	32	1		32		考试 Exam	2	
GR142007	体育 (3) (系列课程) Physical Education (3)	32	1		32		考试 Exam	3	
GR142008	体育 (4) (系列课程) Physical Education (4)	32	1		32		考试 Exam	4	
总计 Total		634	35	452	182	26			

2、通识教育选修 (Selective Courses of General Education): 192 学时 (192Hours), 12 学分 (12 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	7	考查 Term Paper	2-8	4 个类别中选修 7 个学分, 其中,《大学生安全教育》(1 学分) 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	
3	自然文化类 Natural Culture Courses	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	5-8	
5	创新创业教育类 (含在线课程) Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5	3	考查 Term Paper	2-8	选修 3 个学分, 其中《新生研讨课》(1 学分) 必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 6	2	考查 Term Paper	2-4	
总计 Total			12			

3、学科基础课程 (Disciplinary Fundamental Courses): 848 学时 (848 Hours), 53 学分 (53 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
DR191001	高等数学 A (1) Advanced Mathematics A(1)	96	6	96			考试 Exam	1	
DR191002	高等数学 A (2) Advanced Mathematics A(2)	96	6	96			考试 Exam	2	
DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistic	48	3	48			考试 Exam	4	
SR193104	数值分析 Numerical Analysis	48	3	48			考试 Exam	5	
DR191008	大学物理 (1) College Physics (1)	48	3	48			考试 Exam	2	
DR192009	大学物理 (2) College Physics (2)	48	3	48			考试 Exam	3	
DR043084	数字电子技术 Digital Electronic Technology	48	3	48			考试 Exam	3	
IS040015	计算机科学与技术专业导论 Introduction to professional	16	1	16			考查 Term Paper	1	
DR041226	程序设计基础 C Fundamental of Programming C	48	3	32		16	考试 Exam	1	
DR042004	C++ 程序设计 C++ Programming	48	3	30		18	考试 Exam	2	
DR042227	离散数学 Discrete Mathematics	48	3	48			考试 Exam	3	
DR042228	微机原理与汇编语言 Microcomputer Principle and Assembly Language	32	2	22		10	考试 Exam	3	
DR042006	数据结构 Data Structures	48	3	48			考试 Exam	3	

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
DR042007	计算机网络 Computer Networks	48	3	40		8	考试 Exam	4	
DR043008	计算机组成与体系结构 Computer Organization and Architecture	48	3	32		16	考试 Exam	4	
DR043010	操作系统原理 The Principle of Operating Systems	48	3	48			考试 Exam	5	
总计 Total		848	53	780		68			

4、专业核心课程 (Specialized Core Courses): 336 学时 (336 Hours), 21 学分 (21 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
SR043017	数据库原理 Principles of Database Systems	48	3	48			考试 Exam	4	
DR043009	算法设计与分析 Algorithm Design and Analysis	48	3	32		16	考试 Exam	5	
SR043280	面向对象分析与设计 Object-Oriented Analysis and Design	48	3	32		16	考查 Term paper	5	
SR043015	计算机图形学 Computer Graphics	48	3	32		16	考查 Term paper	6	
SR043281	软件工程导论 Software Engineering	48	3	32		16	考查 Term paper	6	
DR043011	编译原理 Principles of Compilers	48	3	48			考试 Exam	6	
SR043287	网络安全导论 Network Security	48	3	32		16	考查 Term paper	6	
总计 Total		336	21	256		80			

5、专业拓展课程 (Specialized Development Courses): 112 学时 (112 Hours), 7 学分 (7 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SR043288	嵌入式软件技术 Embedded Development Technology	32	2	20		12	考查 Term Paper	5	
SS043243	高性能计算导论 Introduction to High Performance Computing	32	2	20		12	考查 Term Paper	5	
SS043216	人工智能原理 Principles of Artificial Intelligence	32	2	24		8	考试 Exam	6	
SS040037	计算机与科学计算问题 Computer And Scientific Computing Problems	16	1	16			考查 Term Paper	7	
总计 Total		112	7	80		32			

6、课程实践 (Course Practice): 32 周 +64 学时 (32 weeks and 64 hours), 30 学分 (30 Credits)

课程代码 Course Code	课程名称 Course Name	周数 (学时) Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR311003	军事理论及训练 Military Theory and Training	2 周	1	考查 Term Paper	1	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考查 Term Paper	1 夏	
PR191045	实验物理 (1) Physics Experiments (1)	24 学时	1	考试 Exam	2	
PR192046	实验物理 (2) Physics Experiments (2)	24 学时	1	考试 Exam	3	
PR043104	数字电子技术实验 Digital Electronic Technology Experiments	16 学时	1	考查 Term Paper	3	
PR042023	C++ 程序设计课程设计 C++ Programming Course Design	2 周	2	考查 Term Paper	1 夏	
PR042024	数据结构课程设计 Data Structures Course Design	2 周	2	考查 Term Paper	3	

课程代码 Course Code	课程名称 Course Name	周数(学时) Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR043025	操作系统课程设计 Operating Systems Course Design	2 周	2	考查 Term Paper	5	
PR043026	编译原理课程设计 Principles of Compilers Course Design	2 周	2	考查 Term Paper	6	
PR041283	计算机基础实习 Computer Basic Practice	2 周	2	考查 Term Paper	1 夏	
PR042284	计算机系统实习 Computer System Practice	4 周	4	考查 Term Paper	2 夏	
PR043285	计算机综合实习 Computer Comprehensive Practice	4 周	4	考查 Term Paper	3 夏	
PR044027	毕业设计(论文) Graduation Design (Thesis)	12 周	6	考查 Term Paper	8	
总计 Total		32 周 +64 学时	30			

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.

八、毕业要求与培养目标矩阵

毕业要求	培养目标				
	目标 1	目标 2	目标 3	目标 4	目标 5
工程知识		√			
问题分析		√			
设计 / 开发解决方案		√		√	
研究能力		√		√	√
使用现代工具		√			
工程与社会	√		√		
环境和可持续发展	√				√
职业规范	√				
个人与团队				√	
沟通			√	√	√
项目管理			√	√	
终身学习		√			√

九、课程与毕业要求关系矩阵

课程名称 \ 毕业要求	(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
思想道德与法治			M			M	M					
大学生心理素质教育			L					M				
中国近现代史纲要								L				
马克思主义基本原理							M	M			L	
毛泽东思想和中国特色社会主义理论体系概论							M	M				
习近平新时代中国特色社会主义思想概论							M	M				
形势与政策								H			L	
大学英语										M		
大学英语素质拓展										L		
大学生职业生涯规划与就业指导			L					M				M
高等数学 A	H	L										
线性代数	M											
概率论与数理统计	M											
数值分析	M	M		M				L				
大学物理	H			L								
数字电子技术	H			L								
离散数学	L	M										
人工智能专业导论					L			L		M		M
程序设计基础 C	M				M							
C++ 程序设计	M				M							
微机原理与汇编语言	M				L							
数据结构		M										
计算机网络	M			M		H						
计算机组成与体系结构	M			M								
操作系统原理	M			L								L

课程名称	毕业要求	(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
编译原理		M			M								
面向对象分析与设计										M			
嵌入式软件技术				M									
算法设计与分析			M	L									
计算机图形学			L		L								
软件工程导论										M	L	H	
数据库原理	M				M								
网络安全导论				H			H						
高性能计算导论					L	M							
人工智能原理			L		L	L					L		
计算机与科学计算问题 (学科前沿课)											L		M
实验物理	M				M								
数字电子技术实验	M			L	M								
C++ 程序设计课程设计				M		M							
数据结构课程设计				H									
操作系统课程设计				M		M							
编译原理课程设计				M		M							
计算机基础实习	M					M							
计算机系统实现						H							L
计算机综合实习				M	M								
毕业设计				H		H		M		M	H	H	M
军事技能									L	L			
军事理论									L				
思想政治社会实践									M				
课外实践							L	M	L	H		M	L

注：H 表示课程对毕业要求指标支撑度高；M 表示课程对毕业要求指标支撑度中等；L 表示课程对毕业要求指标支撑度低。

软件工程专业培养方案

一、专业培养目标

本专业面向国家经济建设和社会需求，围绕软件产业需要，培养德、智、体、美、劳全面发展，适应国际化需要，培养掌握扎实的软件工程专业基础知识，具备良好的软件设计与实现能力、良好的项目管理能力、良好的沟通与交流能力、良好的创新与竞争能力，具有良好的团队协作精神，毕业后可在软件工程及相关应用行业从事软件设计、开发工作的高层次、复合型人才。经过 5 年实际工作，能够承担工程管理工作或胜任跨领域学习的要求。

预期毕业五年以上的毕业生：

- (1) 理解并坚守职业道德规范，具有社会责任感，有意愿并有能力服务社会。
- (2) 能在工业界、学术界成功评估、分析、解决与专业职位相关的工程问题。
- (3) 能够适应独立和团队工作环境，具备与业界同行和社会公众进行有效沟通的能力。
- (4) 能以重要的法律、伦理、社会、环境、网络安全等方面宽广的软件工程视角管理与专业职位相关的多学科项目。
- (5) 具有全球化意识和国际视野，拥有终生的学习习惯和能力。

二、毕业要求

结合培养目标和本专业特色，制定本专业的 12 条毕业要求：

- (1) 工程知识：具备完整的软件工程专业知识结构，表现为良好的软件理论、软件系统设计、项目管理能力以及和其他学科的融合及创新能力；具有扎实的工程基础知识和实践能力。
- (2) 问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达，并通过文献研究和调研分析来解决软件工程相关领域的复杂工程问题，以获得有效结论。
- (3) 设计 / 开发解决方案：能够设计针对软件工程相关领域复杂工程问题的解决方案，设计满足特定需求的系统或原型，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) 研究能力：掌握科学思维方法和科学研究方法；具备求实创新意识和严谨的科学素养；能够基于科学原理并采用科学方法对软件工程相关领域的复杂工程问题进行研究，包括设计实验、分析和解释数据，并通过信息综合得到合理有效的结论。
- (5) 使用现代工具：能够针对软件工程相关领域的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息工具，在理解相关工具的特点及局限性基础上，进行模拟、系统开发和测试，并对实验结果进行分析评估。
- (6) 工程与社会：能够基于工程背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。
- (7) 环境和可持续发展：熟悉环境保护和可持续发展等方面的方针、政策和法律、法规，能够理解和评价针对人工智能相关领域复杂工程问题及其工程实践对环境、社会可持续发展的影响。
- (8) 职业规范：具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德、规范及行业标准，履行责任。
- (9) 个人和团队：具有一定的文学艺术修养和现代意识，具有国际视野和跨文化的交流、竞争与合作能力。参与团队工程项目训练，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。

（10）沟通：能够就软件工程相关领域的复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写技术报告和设计文稿、陈述发言、清晰表达或回应指令，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。

（11）项目管理：具有较强的表达能力和人际交往能力以及在团队中发挥作用的能力。具有团队项目经验，理解并掌握工程管理原理与经济决策方法，并能在多学科环境中应用。

（12）终身学习：具有自主学习和终身学习的意识，掌握文献检索、资料查询及其他手段获取相关信息的基本方法；有不断学习和适应发展的能力。

三、主干学科

软件工程。

四、学制与学位

学制四年。学生修满规定的最低毕业学分，达到毕业要求后，授予工学学士学位。

五、核心课程

核心课程：计算机网络、操作系统概论、离散结构、数据结构与算法、算法设计与分析、数据库系统原理及应用、面向对象程序设计、Java 程序设计、软件测试、人机交互软件设计、面向对象分析与设计、大型软件系统设计、嵌入式软件技术、软件工程导论、软件体系结构、软件项目管理、软件测试、软件度量等。

实践课程：软件工程基础实习、软件工程设计实习、软件工程综合实习、面向对象程序设计实践、数据库设计实践、面向对象建模实践、数据结构实践、网页程序设计实践等。

Undergraduate Program in Software Engineering

1. Academic Objectives

The major of software engineering meets the requirements of national economic construction and social development. Based on practical needs in software industries, the major aims to cultivate high-level and compound talents who are with all-round abilities in morality, intelligence, sports, art and labor, adapt to the needs of internationalization, grasp solid basic knowledge of software engineering, grasp good software design and implementation ability, grasp good project management ability, grasp good communication and exchange ability, grasp good innovativeness and competitiveness, and grasp good teamwork spirit. The graduates can engage in software designing and developing in software engineering related application industries as high-level and comprehensive talents. After 5-years' real work practice, graduates would be able to undertake engineering management work and meet the requirements of interdisciplinary learning.

The students in five years after graduation will have the following abilities.

- (1) Understand and persist to professional ethics, have a sense of social responsibility, have the ability to serve the society.
- (2) Successfully evaluate, analyze, and solve engineering problems related to professional positions in industry and academia.
- (3) Be able to adapt to independent and team work environments, and have the ability to communicate effectively with industry peers and the public.
- (4) Be able to manage multidisciplinary projects with a broad systemic perspective.
- (5) Have a sense of globalization and international vision, lifelong learning habits and abilities, and strong workplace competitiveness in the software engineering field.

2. Graduation Requirements

Combine the training objectives with the characteristics of this major, the 12 graduation requirements of this major are as follows.

- (1) (Engineering Knowledge): With a complete software engineering knowledge, students can use mathematics, natural science, engineering foundation and professional knowledge to solve complex engineering problems in related fields.
- (2) (Problem Analysis): Students can neatly use the basic principles of mathematics, natural sciences, and engineering science. Then can also research and analyze the complex engineering problems related to software engineering by literature research.
- (3) (Design/Development Solution): Students have the ability to design solutions of complex engineering problems in software engineering fields and design prototype system to meet specific needs. In these design process, they should take into account social, health, safety, legal, cultural, and environmental factors.
- (4) (Research Ability): Students can adopt science methods to study for complex engineering problems in software engineering fields. According to designing experiments and analyzing experimental results, students can obtain reasonable conclusion.
- (5) (Using Modern Tools): During solving complex engineering problems, students can develop and utilize modern tools.
- (6) (Engineering and Society): Based on engineering background knowledge, students can evaluate the impact of professional engineering practice and complex engineering problem solutions for society, health, safety, law and culture.
- (7) (Environment and Sustainable Development): Students can understand and evaluate the impact of

complex engineering problems and their engineering practices for environmental and social sustainability.

(8) (Professional Norms): With humanities and social science literacy and social responsibility, students can understand and obey engineering ethics, norms and industry standards in engineering practice.

(9) (Individual and Team): Students can assume the roles of individual, team member, and responsible individual in a multidisciplinary team.

(10) (Communication): Students can effectively communicate with industry peers and the public on complex engineering issues in software engineering related fields. They can also write technical reports, have a certain international perspective, and communicate in a cross-cultural context.

(11) (Project Management): Students have the experience of team projects, understand and master engineering management principles and economic decision-making methods, and apply them in a multidisciplinary environment.

(12) (Life-Long Learning): Students have the consciousness of independent learning and lifelong learning, and have the ability to continuously learn and adapt to society development.

3. Main disciplines

Software engineering.

4. Length of Schooling and Degree

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

5. Core Courses

Core Courses: Computer Networks; Introduction to Operating Systems; Discrete Mathematics; Data Structure and Algorithm; The Design and Analysis of Algorithms; Database System Principles and Application; Object Oriented Programming; Human-Computer Interaction Software Design; Object-Oriented Analysis and Design; Java Programming; Large-Scale Software System Design; Embedded Development Technology. Software Engineering; Software Architecture; Software Project Management; Software Test; Software Measurement;

Core Practice: Software Engineering Practice; Practice of Object Oriented Programming; Practice of Database Design; Practice of Object Oriented Modeling; Practice of Data Structure; Practice of Web Page Programming.

六、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	666	37	11	9		4	5	1	3	1			2
	通识教育选修课程 Selective Courses of General Education	192	12											
	学科基础课程 Disciplinary Fundamental Courses	832	52	7	13		14	12			6			
专业教育 Professional Education	专业核心课程 Specialized Fundamental Courses	448	28					3		11	8.5		5.5	
	专业拓展课程 Specialized Development	80	5							2	3			
实践教育 Practical Education	课程实践 Course Practice	25 周 +128 学时	28			4	2	6	5	2		4		6
	课外实践 Extracurricular practice	—	6											
必修课总学分 Required course credits				145										
选修课总学分 Elective course credits				23										
最低毕业总学分 Total Credits				168										

七、课程设置 (Curriculum)

1、通识教育必修课程 (Required Courses of General Education): 666 学时 (666 Hours), 37 学分 (37 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
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	
GR183004	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	64	4	48	16		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	

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
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	
GR303006	大学生心理素质教育 (2) Mental Health (2)	16	1	16			考查 Term Paper	5	
GR302008	军事理论 Military Theory	36	1	36			考查 Term Paper	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)	32	1		32		考试 Exam	1	
GR141006	体育 (2) (系列课程) Physical Education (2)	32	1		32		考试 Exam	2	
GR142007	体育 (3) (系列课程) Physical Education (3)	32	1		32		考试 Exam	3	
GR142008	体育 (4) (系列课程) Physical Education (4)	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	10	12	10	考试 Exam	1	
总计 Total		666	36	462	194	10			

2、通识教育选修 (Selective Courses of General Education): 192 学时 (192Hours), 12 学分 (12 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	7	考查 Term Paper	2-8	4 个类别中选修 7 个学分, 其中,《大学生安全教育》(1 学分) 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	
3	自然文化类 Natural Culture Courses	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	5-8	
5	创新创业教育类 (含在线课程) Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5	3	考查 Term Paper	2-8	选修 3 个学分, 其中《新生研讨课》(1 学分) 必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 6	2	考查 Term Paper	2-4	
总计 Total			12			

3、学科基础课程 (Disciplinary Fundamental Courses): 832 学时 (832 Hours), 52 学分 (52 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR041246	程序设计基础 Fundamentals of Programming	64	4	24	24	16	考试 Exam	2	
IS040016	软件工程专业导论 Introduction to Professional	16	1	16			考查 Term Paper	1	
DR191001	高等数学 A (1) Advanced Mathematics A(1)	96	6	96			考试 Exam	1	
DR191002	高等数学 A (2) Advanced Mathematics A(2)	96	6	96			考试 Exam	2	
DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistic	48	3	48			考试 Exam	4	
DR042227	离散数学 Discrete Mathematics	48	3	48			考试 Exam	3	
DR191008	大学物理 (1) College Physics (1)	48	3	48			考试 Exam	2	
DR192009	大学物理 (2) College Physics (2)	48	3	48			考试 Exam	3	
DR042055	数据库系统原理及应用 Database System Principles and Application	48	3	24		24	考试 Exam	4	
DR042006	数据结构 Data Structures	48	3	48			考试 Exam	3	
DR042248	面向对象程序设计 Object Oriented Programming	48	3	30		18	考试 Exam	3	
DR042058	Java 程序设计 Java Programming	48	3	28		20	考试 Exam	4	
DR043059	操作系统概论 Introduction to Operating Systems	48	3	40		8	考试 Exam	6	
DR042007	计算机网络 Computer Networks	48	3	40		8	考试 Exam	4	
DR043008	计算机组成与体系结构 Computer Organization and Architecture	48	3	32		16	考试 Exam	6	
总计 Total		832	52	698	24	110			

4、专业核心课程 (Specialized Core Courses): 448 学时 (448 Hours), 28 学分 (28 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
SR042249	人机交互软件设计 Human-Computer Interaction Software Design	48	3	26		22	考查 Term Paper	4	
DR043009	算法设计与分析 The Design and Analysis of Algorithms	48	3	32		16	考试 Exam	5	
SR043250	大型软件系统设计 (上) Large-Scale Software System Design(Part A)	48	3	24		24	考查 Term Paper	5	
SR043288	嵌入式软件技术 Embedded Development Technology	32	2	20		12	考查 Term Paper	5	
SR043280	面向对象设计模式 Object-Oriented Design Patterns	48	3	32		16	考查 Term Paper	5	
SR043251	大型软件系统设计 (下) Large-Scale Software System Design(Part B)	56	3.5	32		24	考查 Term Paper	6	
SR043281	软件工程导论 Software Engineering	48	3	32		16	考查 Term Paper	6	
SR043069	软件测试 Software Test	32	2	20		12	考查 Term Paper	6	
SR044065	软件体系结构 Software Architecture	32	2	28		4	考查 Term Paper	7	
SR044255	软件项目管理 Software Project Management	24	1.5	16		8	考查 Term Paper	7	
SR044067	软件度量 Software Measurement	32	2	24		8	考试 Exam	7	
总计 Total		448	28	286		162			

5、专业拓展课程 (Specialized Development Courses): 80 学时 (80 Hours), 5 学分 (5 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SS043242	云计算虚拟化应用技术 Virtualization Application and Technology of Cloud Computing	32	2	20		12	考查 Term Paper	6	
SS043256	学科前沿课 (智能科学与技术) Discipline Frontiers (Intelligence Science and Technology)	16	1	16			考查 Term Paper	6	
SS043243	高性能计算导论 High Performance Computing	32	2	20		12	考试 Exam	5	
总计 Total		80	5	56		24			

6、课程实践 (Course Practice): 25 周 +128 学时 (25 weeks and 128 hours), 28 学分 (28 Credits)

课程代码 Course Code	课程名称 Course Name	周数 (学时) Week(hour)	学分 Credits	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	1	考查 Term Paper	1	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考试 Exam	1 夏	
PR041257	软件工程基础实习 Software Engineering Practice (Basics)	2 周	2	考查 Term Paper	1 夏	
PR042258	软件工程设计实习 Software Engineering Practice (Advanced)	3 周	3	考查 Term Paper	2 夏	
PR043259	软件工程综合实习 Software Engineering Practice (Comprehensive)	4 周	4	考查 Term Paper	3 夏	
PR042260	面向对象程序设计实践 Practice of Object Oriented Programming	32 学时	2	考查 Term Paper	4	
PR042261	数据库设计实践 Practice of Database Design	32 学时	2	考查 Term Paper	4	

课程代码 Course Code	课程名称 Course Name	周数（学时） Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR043262	面向对象建模实践 Practice of Object Oriented Modeling	32 学时	2	考查 Term Paper	5	
PR042024	数据结构课程实践 Practice of Data Structure	2 周	2	考查 Term Paper	3	
PR042264	网络程序设计实践 Practice of Web Programming	32 学时	2	考查 Term Paper	4	
PR044078	毕业设计（论文） Graduation Design (Thesis)	12 周	6	考查 Term Paper	8	
总计 Total		25 周 +128 学时	28			

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.

八、毕业要求与培养目标矩阵（工程教育认证类专业）

毕业要求	培养目标				
	目标 1	目标 2	目标 3	目标 4	目标 5
工程知识		√			
问题分析		√			
设计 / 开发解决方案		√		√	
研究能力		√		√	√
使用现代工具		√			
工程与社会	√		√		
环境和可持续发展	√				√
职业规范	√				
个人与团队				√	
沟通			√	√	√
项目管理			√	√	
终身学习		√			√

九、课程与毕业要求关系矩阵（工程教育认证类专业）

课程名称 \ 毕业要求	(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
思想道德与法治			M			M	M					
大学生心理素质教育			L					M				
中国近现代史纲要								L				
马克思主义基本原理							M	M			L	
毛泽东思想和中国特色社会主义理论体系概论							M	M				
习近平新时代中国特色社会主义思想概论							M	M				
形势与政策								H			L	
大学英语										M		
大学英语素质拓展										L		
大学生职业生涯规划与就业指导			L					M				M
高等数学 A	H	L										
线性代数	M											
概率论与数理统计	M											
大学物理	H											
离散数学	H	M										
大学计算机						L	L					
软件工程专业导论	M					L		M				M
程序设计基础	M											
面向对象程序设计	M		L									
Java 程序设计	M			M								
嵌入式软件技术			M			M						
云计算虚拟化应用技术				M		M						
数据结构	M	M										
计算机网络	M					M						
计算机组成与体系结构	M	M										

课程名称	毕业要求	(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
操作系统概论		M			M								
面向对象分析与设计				L	M					M			
软件工程导论						M				M	L		
数据库原理及应用	M				M								
软件测试					M							M	
软件度量			M		M								
软件体系结构			L		M								
软件项目管理				M								H	
大型软件系统设计				M						H			
人机交互软件设计				M	M								
算法设计与分析			H		M								
面向对象程序设计实践	M					M							
数据库设计实践				M	M	M							
面向对象建模实践				M	M	M							
数据结构课程设计				M	M								
网络程序设计实践				M		L							
云计算虚拟化应用技术				M		H							
智能科学与技术（学科前沿课）						M		L			L		
高性能计算导论			L		L								
软件工程基础实习							H						L
软件工程设计实习						H							L
软件工程综合实习						H							L
毕业设计				H	M	H		H		M	H	H	M
军事技能									L	L			
军事理论									L				
思想政治社会实践									M				
课外实践							L	M	L	H		M	L

注：H 表示课程对毕业要求指标支撑度高；M 表示课程对毕业要求指标支撑度中等；L 表示课程对毕业要求指标支撑度低。

数据科学与大数据技术专业培养方案

一、专业培养目标

本专业面向国民经济建设及社会发展的需要，培养德、智、体、美全面发展，掌握扎实的计算机软、硬件基础理论和先进的数据科学理论与方法，掌握数据采集、存储、管理和分析相关的专业知识，具备大数据技术应用开发与分析能力，具有良好的科学素养、职业道德和社会责任心，毕业后可运用所学知识与技能在互联网企业、金融机构、科研院所、高等院校等机构或企事业单位从事大数据处理、挖掘、分析、服务、应用和研究工作的复合型人才。

预期毕业五年以上的毕业生：

- (1) 理解并坚守职业道德规范，具有社会责任感，有意愿并有能力服务社会。
- (2) 能在工业界、学术界成功评估、分析、解决与专业职位相关的工程问题。
- (3) 能够适应独立和团队工作环境，具备与业界同行和社会公众进行有效沟通的能力。
- (4) 能以重要的法律、伦理、社会、环境、网络安全和经济等方面宽广的系统视角管理与专业职位相关的多学科项目。
- (5) 具有全球化意识和国际视野，拥有终生的学习习惯和能力，在计算机领域具有较强的职场竞争力。

二、毕业要求

本专业学生主要学习数据科学与大数据技术方面的基本理论，系统掌握大数据系统的搭建、建模与数据分析的基本技能，熟悉自然科学与社会科学中多个应用领域的大数据类型，理解网络信息社会中数据的生命周期，从而形成系统、模型、算法、高效求解与推理等核心专业意识；掌握数据科学的基本思维和研究方法，具备综合运用大数据知识、方法和技术解决交叉学科实际问题的初步能力。毕业生应具备知识、素质和能力等方面的如下要求：

要求 1. 工程知识：具备扎实的大数据工程专业知识，用于描述和分析大数据系统、大数据应用工程、大数据科学研究等相关复杂问题的能力。

要求 2. 问题分析：能够应用数学、自然科学和工程科学的基本原理，掌握大数据基本技术和平台软件，能够识别、表达和研究分析数据科学与大数据技术相关领域的复杂工程问题。

要求 3. 设计 / 开发解决方案：能够以行业大数据分析基本知识和基本理论为背景，熟练掌握与行业应用相关的数据分析、建模和实践技能，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。

要求 4. 研究：能够对大数据系统、大数据应用及相关复杂工程问题进行实验设计、数据分析与结果评价，进而得到合理有效的结论。

要求 5. 使用现代工具：能够合理地选择技术开发工具和资源并运用于复杂工程问题的设计、开发、仿真及验证过程中。

要求 6. 工程与社会：能够基于大数据知识、地理、商业、金融等方向的背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

要求 7. 环境和可持续发展：了解信息产业以及计算机和数据科学与大数据技术相关领域的基本发展方针、政策和国家法律法规，能够考虑和评价实际工程实践活动对环境、社会可持续发展的影响。

要求8. 职业规范：具有人文社会科学素养、社会责任感，能够在大数据分析领域的地理数据分析、金融数据分析、分布式系统与云计算等方向的实践中理解并遵守工程职业道德和规范，履行责任。

要求9. 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。

要求10. 沟通：能够就所面临的复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令，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。

要求11. 项目管理：理解并掌握工程项目管理方法，能够对数据科学与大数据技术开发项目进行有效的组织、实施和管理。

要求12. 终身学习：具有自主学习和终身学习的意识，能够适应未来社会的发展。

三、主干学科

计算机科学与技术、统计学。

四、学制与学位

学制四年。修满规定的最低毕业学分，完成规定的实践必修课，通过毕业论文答辩，授予工学学士学位。

五、核心课程

专业核心课程：数据挖掘、数据分析及可视化、大数据技术原理与应用、机器学习、时间序列分析、多元统计分析、人工智能原理、操作系统概论、计算机组成与体系结构、软件工程导论和高性能计算导论等。

实践课程：数据结构实践、数据库设计实践，暑期综合应用实践课程，以及毕业设计。

Undergraduate Program in Data Science and Big Data Technology

1. Academic Objectives

The professional application of knowledge in national economic construction and social development needs to cultivate the comprehensive development of morality, intelligence, physical and beauty, master solid computer software and hardware basic theory and advanced data science theory and method, including data collection, storage, management and analysis; have big data technology development and analysis capabilities, and have good scientific research, professional ethics and social responsibility. After graduation, based on their knowledge and technology, they can be engaged in big data processing, mining, analysis, services and applied research in Internet companies, financial institutions, institutional research institutes, universities and other institutions or enterprises and institutions.

The students in five years after graduation will have the following abilities.

- (1) Understand and persist to professional ethics, have a sense of social responsibility, have the ability to serve the society.
- (2) Successfully evaluate, analyze, and solve engineering problems related to professional positions in industry and academia.
- (3) Be able to adapt to independent and team work environments, and have the ability to communicate effectively with industry peers and the public.
- (4) Be able to manage multidisciplinary projects with a broad systemic perspective.
- (5) Have a sense of globalization and international vision, lifelong learning habits and abilities, and strong workplace competitiveness in the computer field.

2. Graduation Requirements

Students of this major mainly learn the basic theories of data science and big data technology, systematically master the basic skills of big data system construction, modeling and data analysis, are familiar with big data types in various application fields in natural science and social science, and understand the life cycle of data in the network information society, thereby forming core professional awareness such as systems, models, algorithms, efficient solutions and reasoning; master the basic thinking and research methods of data science, and have the comprehensive use of big data knowledge, methods and technologies to solve practical problems in interdisciplinary subjects Initial ability. Graduates should possess the following knowledge, qualities and abilities:

- (1) (Engineering Knowledge): With a complete Data Science and Big Data Technology knowledge, students can describe and analyze complex problems related to big data systems, big data application engineering, and big data scientific research.
- (2) (Problem Analysis): Students can neatly use the basic principles of mathematics, natural sciences and engineering science, and master the basic technology and platform software of Big Data. They can also research and analyze the complex engineering problems related to Data Science and Big Data Technology.
- (3) (Design/Development Solution): Based on the basic knowledge and theory of big data analysis, the students can master the data analysis, modeling and practical skills related to industry application, and be able to reflect the sense of innovation in the design process. In these design process, they should take into account social, health, safety, legal, cultural, and environmental factors.
- (4) (Research Ability): Students can adopt science methods to study complex systems and applications in the Data Science and Big Data Technology fields. According to designing experiments and analyzing

experimental results, students can obtain reasonable conclusion.

(5) (Using Modern Tools): students can develop and utilize modern tools in solving complex engineering problems, including designing, developing, modeling and validating process.

(6)(Engineering and Society): Based on Data Science and Big Data Technology background knowledge, students can evaluate the impact of professional engineering practice and complex engineering problem solutions for society, health, safety, law and culture.

(7) (Environment and Sustainable Development): Students can understand the basic development guidelines, policies and national laws and regulations of information industry, computer and data science and big data technology related fields. They can also understand and evaluate the impact of complex engineering problems and their engineering practices for environmental and social sustainability.

(8) (Professional Norms): With humanities and social science literacy and social responsibility, students can understand and obey engineering ethics, norms and industry standards in big data relevant engineering practice.

(9) (Individual and Team): Students can assume the roles of individual, team member, and responsible individual in a multidisciplinary team.

(10) (Communication): Students can effectively communicate with industry peers and the public on complex engineering issues. They can also write technical reports, design a manuscript, make a presentation, articulate or respond to instructions have a certain international perspective, and communicate in a cross-cultural context.

(11) (Project Management): Students can understand and master engineering management principles, and Effectively organize, implement and manage data science and big data technology development projects.

(12) (Life-Long Learning): Students have the consciousness of independent learning and lifelong learning, and have the ability to continuously learn and adapt to society development.

3. Main disciplines

Computer Science and Technology, Statistics.

4. Length of Schooling and Degree

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

5. Core Courses

Professional core courses: data mining, data analysis and visualization, big data technology principles and applications, machine learning, time series analysis, multivariate statistical analysis, operating system principles, principles of artificial intelligence, computer composition and architecture, introduction to software engineering, and introduction to high performance computing, etc.

Practical courses: data structure practice, database design practice, comprehensive application practice courses of summer and graduation project.

六、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	666	37	11	9		4	5	1	3	1			2
	通识教育选修课程 Selective Courses of General Education	192	12											
	学科基础课程 Disciplinary Fundamental Courses	832	52	6	14		17	12		3				
专业教育 Professional Education	专业核心课程 Specialized Fundamental Courses	448	28							17	9		2	
	专业拓展课程 Specialized Development	80	5								5			
	课程实践 Course Practice	27 周 +80 学时	25			6	3	2	3			6		6
实践教育 Practical Education	课外实践 Extracurricular practice		6											
	必修课总学分 Required course credits			142										
选修课总学分 Elective course credits				23										
最低毕业总学分 Total Credits				165										

七、课程设置 (Curriculum)

1、通识教育必修课程 (Required Courses of General Education): 666 学时 (666 Hours), 37 学分 (37 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
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	
GR183004	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	64	4	48	16		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	

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
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	
GR303006	大学生心理素质教育 (2) Mental Health (2)	16	1	16			考查 Term Paper	5	
GR302008	军事理论 Military Theory	36	1	36			考查 Term Paper	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)	32	1		32		考试 Exam	1	
GR141006	体育 (2) (系列课程) Physical Education(2)	32	1		32		考试 Exam	2	
GR142007	体育 (3) (系列课程) Physical Education(3)	32	1		32		考试 Exam	3	
GR142008	体育 (4) (系列课程) Physical Education (4)	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	10	12	10	考试 Exam	1	
总计 Total		666	36	462	194	10			

2、通识教育选修 (Selective Courses of General Education): 192 学时 (192Hours), 12 学分 (12 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	7	考查 Term Paper	2-8	4 个类别中选修 7 个学分, 其中,《大学生安全教育》(1 学分) 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	
3	自然文化类 Natural Culture Courses	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	5-8	
5	创新创业教育类 (含在线课程) Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5	3	考查 Term Paper	2-8	选修 3 个学分, 其中《新生研讨课》(1 学分) 必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 6	2	考查 Term Paper	2-4	
总计 Total			12			

3、学科基础课程 (Disciplinary Fundamental Courses): 832 学时 (832 Hours), 52 学分 (52 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR191001	高等数学 A (1) Advanced Mathematics A (1)	96	6	96			考试 Exam	1	
DR191002	高等数学 A (2) Advanced Mathematics A (2)	96	6	96			考试 Exam	2	
DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistic	48	3	48			考试 Exam	3	
SR192115	离散数学 Discrete Mathematics	48	3	48			考试 Exam	3	
DR191008	大学物理 (1) College Physics (1)	48	3	48			考试 Exam	2	
DR192009	大学物理 (2) College Physics (2)	48	3	48			考试 Exam	3	
DR043084	数字电子技术 Digital Electronics Technique	48	3	48			考试 Exam	3	
DR041246	程序设计基础 Fundamentals of Programming	64	4	24	24	16	考试 Exam	2	
DR041265	数据科学与大数据技术专业导论 Introduction to Professional Courses	16	1	16			考查 Term Paper	2	
DR042058	Java 程序设计 Java Programming	48	3	28		20	考试 Exam	4	
DR042006	数据结构 Data Structures	48	3	48			考试 Exam	3	
DR042055	数据库系统原理及应用 Database System Principles and Application	48	3	24		24	考试 Exam	4	
DR043009	算法设计与分析 Algorithm Design and Analysis	48	3	32		16	考试 Exam	5	
SR192113	数据建模 Data Modeling	48	3	48			考查 Term Paper	4	
DR042007	计算机网络 Computer Networks	48	3	40		8	考试 Exam	4	
总计 Total		832	52	724	24	84			

4、专业核心课程 (Specialized Core Courses): 448 学时 (448 Hours), 28 学分 (28 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SR043266	数据挖掘 Data Mining	48	3	32		16	考试 Exam	5	
SR043267	大数据技术原理与应用 Principles and Applications of Big Data Technology	48	3	32		16	考试 Exam	5	
SR043268	数据分析及可视化 Data Analysis and Visualization	32	2	20		12	考试 Exam	5	
SR194109	时间序列分析 Analysis of Time Series	48	3	48			考试 Exam	5	
SR193108	多元统计分析 Multivariate Statistical Analysis	48	3	48			考试 Exam	6	
SS043237	机器学习 Machine Learning	32	2	20		12	考查 Term Paper	6	
SS043216	人工智能原理 Principles of Artificial Intelligence	32	2	24		8	考试 Exam	6	
DR042249	地理信息系统原理 Principles of Geographic Information System	48	3	48			考试 Exam	5	
DR043059	操作系统概论 Introduction to Operating Systems	48	3	40		8	考试 Exam	6	
SS043243	高性能计算导论 Introduction to High Performance Computing	32	2	20		12	考查 Term Paper	5	
SS044203	地球科学大数据原理与应用 Principles and Applications of Big Data in	32	2	32			考查 Term Paper	7	
总计 Total		448	28	380		68			

5、专业拓展课程 (Specialized Development Courses): 80 学时 (80 Hours), 5 学分 (5 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SR073121	数据挖掘与商务智能 Data Mining and Business Intelligence	48	3	32	16		考试 Exam	6	
SS043242	云计算虚拟化应用技术 Virtualization Application and Technology of Cloud Computing	32	2	20		12	考查 Term Paper	6	
总计 Total		80	5	52	16	12			

6、课程实践 (Course Practice): 27 周 +80 学时 (27 weeks and 80 hours), 25 学分 (25 Credits)

课程代码 Course Code	课程名称 Course Name	周数 (学时) Week(hour)	学分 Credits	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	1	考查 Term Paper	1	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考试 Exam	1 夏	
PR041269	程序设计编程实践 Programming Practice	2 周	2	考查 Term Paper	1 夏	
PR042270	大数据编程基础实践 Big Data Practice (Basic)	3 周	3	考查 Term Paper	2 夏	
PR043289	专业实习 Productive practice	6 周	6	考查 Term Paper	3 夏	
PR043104	数字电子技术实验 Digital Electronics Technique Experiments	16 学时	1	考查 Term Paper	3	
PR042024	数据结构课程设计 Data Structures Course Design	2 周	2	考查 Term Paper	3	
PR042261	数据库设计实践 Practice of Database Design	32 学时	2	考查 Term Paper	4	
PR044241	毕业设计 (论文) Graduation Design (Thesis)	12 周	6	考查 Term Paper	8	
总计 Total		27 周 +80 学时	25			

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.

八、毕业要求与培养目标矩阵

毕业要求	培养目标				
	目标 1	目标 2	目标 3	目标 4	目标 5
工程知识		√			
问题分析		√			
设计 / 开发解决方案		√		√	
研究能力		√		√	√
使用现代工具		√			
工程与社会	√		√		
环境和可持续发展	√				√
职业规范	√				
个人与团队				√	
沟通			√	√	√
项目管理			√	√	
终身学习		√			√

九、课程与毕业要求关系矩阵

课程名称 \ 毕业要求	(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
思想道德与法治			M			M	M					
大学生心理素质教育			L					M				
中国近现代史纲要								L				
马克思主义基本原理							M	M			L	
毛泽东思想和中国特色社会主义理论体系概论							M	M				
习近平新时代中国特色社会主义思想概论							M	M				
形势与政策								H			L	
大学英语										M		
大学英语素质拓展										L		
大学生职业生涯规划与就业指导			L					M				M
大学计算机					M	H	M					
高等数学 A	H	L										
线性代数	M	M		H								
概率论与数理统计	H				M			H				
大学物理	H											
离散数学	H	M										
数字电子技术	H			L								
程序设计基础	M	L			M							
数据科学与大数据技术专业导论			L			M				M	L	H
Java 程序设计					H							
数据结构	H	M	M									
数据库系统原理与应用				H								
算法设计与分析		M	H									
数据建模	M	H										

课程名称	毕业要求	(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
计算机网络		M			M								
数据挖掘		H								M			
大数据技术原理与应用			M	L	M		H	H					
数据分析及可视化					L								L
时间序列分析	H												
多元统计分析	H				M	M							
机器学习					M	L							
人工智能原理			L		L	L					L		
地理信息系统原理							M		M				
操作系统概论					M								
高性能计算导论	M		M			H							
地球科学大数据原理与应 用				M			H				M		
数据挖掘与商务智能										M	L	H	
云计算虚拟化应用技术						H							L
程序设计编程实践				M						M			
大数据编程基础实践				H		M	M						
专业实习											M	H	
数字电子技术实验	M				M								
数据结构课程设计				H									
数据库设计实践				H		M				L		M	
毕业设计				H	M	H		M			H	H	M
军事技能训练									M				
军事理论									H				
思想政治社会实践									M	H			
课外实践							L	M		H		M	L

注：H 表示课程对毕业要求指标支撑度高；M 表示课程对毕业要求指标支撑度中等；L 表示课程对毕业要求指标支撑度低。