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## 信息工程专业培养方案

**专业名称与代码：**信息工程（080706）

**专业培养目标：**

本专业以空间信息科学为基础，以信息获取、信息的表达与存贮、信息的传输、信息网络技术、信息管理、分析为核心建立专业知识结构。培养具有信息开发、处理和应用，以及信息系统设计的专业知识，具备基于 3S 技术（GIS 技术、GNSS 技术、RS 技术）、移动技术、通信网络等技术为基础的空间信息工程、空间信息服务、空间信息平台和空间信息系统集成技术的高级工程技术人才。

培养能在信息产业等相关部门从事信息化软件、新信息服务业务的设计、研发、信息网络集成以及应用等方面工作的信息工程学科的高级工程技术人才，同时也能从事空间信息领域、计算机软件和通信网络领域的专业技术工作；本专业强调与应用领域的密切结合，强调与国内大型企业联合培养新型的人才，强调按企事业单位的具体要求，定制企业所需的开发人才。在培养的课程体系的设置方面，主要体现先进性、灵活性、复合性、工程性。

**专业毕业要求：**

1. 掌握扎实的数学基础理论和良好的外语技能，掌握文献检索的基本方法，学习空间信息科学与技术的基本理论和基本知识；
2. 掌握空间信息系统的采集、开发、分析、处理及应用的技术与方法；
3. 具备分析、设计、开发、测试、维护具有 GIS、GNSS、RS 技术特征的空间信息网络软件的实际工作能力，满足相关行业企业需求；
4. 熟悉互联网络的协议和空间信息领域里的方针、政策和法规；
5. 了解互联网络和空间信息领域里的理论前沿、应用前景、发展动态、行业需求；
6. 具备独立获取知识、提出问题、分析问题和解决问题的能力，具有一定的科学研究和实际工作能力。满足升学和学术机构需求。

## 毕业要求实现及途径：

序号	毕业要求	实现途径（教学过程）
1	具有扎实的数学基础和良好的外语基础，以及具有扎实和宽广的信息领域的理论基础知识；掌握文献检索的基本方法；学习空间信息科学与技术的基本理论和基本知识；	<p>①<b>课堂教学</b>：高等数学 A、线性代数 A、概率论与数理统计 A、离散数学、数据库概论 A、大学物理，物理实验 B、大学英语，信息导论、计算机结构与组成、数据结构。数字测量学、地理信息系统原理、信息网络系统、GNSS 原理及其应用、遥感原理与应用、计算机图形学 A、算法设计与分析、数字信号处理 B</p> <p>②<b>课外学习</b>：参加英语比赛、数学竞赛、建模比赛等活动。</p>
2	掌握空间信息系统的采集、开发、分析、处理及应用的技术与方法；	<p>①<b>课堂教学</b>：空间信息服务系统设计、物联网技术与应用、移动地理信息系统、空间信息工程技术、地理空间信息服务、数字地球与智慧城市等</p> <p>②<b>课外学习</b>：产研学活动、课外科技活动、毕业设计</p>
3	具备分析、设计、开发、测试、维护具有 GIS、GNSS、RS 技术特征的空间信息网络软件的实际工作能力。满足相关行业企业需求；	<p>①<b>课堂教学</b>：计算机高级语言程序设计 C、面向对象程序设计 B、嵌入式操作系统、互联网软件开发、智能终端软件开发、软件测试、面向对象软件工程与 UML；计算机高级语言课程设计（C）、面向对象程序设计课程设计、数据结构课程设计 A、数据库课程设计、地理信息系统实习 B、智能终端软件开发实习、信息网络开发综合实习、导航与定位技术实习</p> <p>②<b>课外学习</b>：鼓励学生参加计算机等级考试和软件工程师考试。开展“蓝桥杯”和“MAPGIS 二次开发”等软件技能大赛。</p>
4	熟悉互联网络的协议和空间信息领域里的方针、政策和法规	<p>①<b>课堂教学</b>：相关的专业课</p> <p>②<b>课外学习</b>：浏览相关的网页、新闻</p>

序号	毕业要求	实现途径（教学过程）
5	了解互联网络和空间信息领域里的理论前沿、应用前景、发展动态、行业需求；	① <b>课堂教学：</b> 信息工程专业前沿文献阅读、高性能计算、社交媒体与大数据、多媒体信息系统、计算机视觉与空间技术。 ② <b>课外学习：</b> 3S 论坛、邀请校内外专家来校做学术讲座。
6	具备独立获取知识、提出问题、分析问题和解决问题的能力，具有一定的科学研究和实际工作能力。满足升学和学术机构需求。	③ <b>课堂教学：</b> 所有专业基础课的学习和专业课的学习 ④ <b>课外学习：</b> 学科竞赛、发明创造、科研报告，如组织学生参加各类竞赛（如挑战杯、大学生创新创业等）、产学研、科技活动、毕业设计等。
	创新创业能力	① <b>课堂教学：</b> 社会调查、创新创业自主学习 ② <b>课外学习：</b> 邀请知名创业人士做报告

**主干学科：**0812 计算机科学与技术，0816 测绘科学与技术

**专业核心课程：**地理信息系统原理、嵌入式操作系统、空间信息服务系统设计、互联网、软件开发、信息网络系统、GNSS 原理及其应用、计算机结构与组成、遥感原理与应用、算法设计与分析、数字信号处理 B

**主要专业实验：**地理信息系统原理，互联网软件开发，GNSS 原理及其应用，计算机结构与组成，计算机图形学 A，算法设计与分析、数字信号处理 B

**主要实践性教学环节：**计算机高级语言课程设计、面向对象程序设计课程设计、数据结构课程设计、数据库课程设计、地理信息系统实习、智能终端软件开发实习、信息网络开发综合实习、导航与定位技术实习、毕业设计。

**修业年限：**四年。

**授予学位：**工学学士。

**相近专业：**计算机科学与技术、软件工程



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## **Program For Information Engineering**

**Specialty and Code:** Information Engineering (080706)

**Education Objective:** This major is on the basis of spatial information science. Its professional knowledge structure is established with information retrieval, information presentation and storage, information transmission, information network technology, information management and analysis as the core. We train high quality engineers which have professional knowledge of fields like information development, processing and application, information system design, spatial information engineering, spatial information service, spatial information platform, spatial information system integration technology that based on 3S (GIS, GNSS, RS) technologies, mobile technology and communications network.

We develop senior technical personnel of information or related industries, who occupy in fields of information software, new information service business design, research and development, information networks integration and applications. Meanwhile, they are competent for other professional technical works such as spatial information science, computer software and communication network area.

This major emphasizes a strong connection with application fields, which results in the combination with large national firms of training the new breed of talents. Also, we tailor our students to meet with the requirements of enterprises and public institutions. In the setting of course systems, we focus on qualities of advancement, flexibility, compositionality and engineering quality.

### **Graduation Requirements:**

1. Have a good command of mathematics and English skills, master the basic approaches in literature retrieval, and learn the fundamental theories and knowledge of spatial information science and technology.
2. Have a good command of the technologies and methods of collection, development, processing and application in spatial information system.
3. Have the practical work ability on analysing, designing, developing, testing and maintaining a spatial information network software which have technical features of GIS, GNSS and RS. Meet the requirements of related industries.
4. Familiar with the network protocols and the policies, strategies and rules in the field of spatial information.
5. Understand the frontier theories, application prospect, development trends, industry needs in the field of Network and Spatial Information.
6. Have the basic skills of obtaining knowledge, questioning, problem analysis and problem

solving. Have a certain capacity for scientific research and practical work. Meet the requirements of academic or higher education institutions.

**Graduation requirements and ways to achieve:**

No.	Graduation requirements	Ways to achieve (teaching process)
1	Have a good command of mathematics and English skills, master the basic approaches in literature retrieval, and learn the fundamental theories and knowledge of spatial information science and technology.	<p>① <b>Classroom Teaching</b> : Advanced Mathematics A; Linear Algebra A; Probability Theory and Mathematical Statistics A; Discrete mathematics; Introduction to Database A; College Physics; Physical Experiment B; College English; Information Introduction; Computer Organization and Architecture; Data Structure. Digital Surveying B, Principle of Geographic Information System, Information Network System, Principles Applications of GNSS and Remote Sensing, Computer Graphics, Algorithms Design and Analysis and Digital Signal Process B.</p> <p>② <b>Out-of-class Learning</b> : Attend English contest, mathematical competition, or modeling contest.</p>
2	Have a good command of the technologies and methods of collection, development, processing and application in spatial information system.	<p>① <b>Classroom Teaching</b> : program design of Advance Computer Language C, Object-Oriented Programming B, Embedded Operating Systems, Internet Software Development; Intelligent terminal software development; Software Testing; Object-Oriented Software Engineering and UML; Curriculum design of Advanced Computer Language(C); Curriculum Design of Object-Oriented Programming; Curriculum Design of Data Structure A; Curriculum Design of Database; Practice of Geographic Information System B; Practice of Intelligent terminal software development; Comprehensive Practice of information network development; Practice of Navigation and positioning technology.</p> <p>② <b>Out-of-class Learning</b>: Encourage students to take the Computer Rank Examination and Software Engineer Examination. Carry out</p>

No.	Graduation requirements	Ways to achieve (teaching process)
		software skills competition, such as the “Blue Bridge Cup” and MAPGIS secondary development.
3	Have the practical work ability on analyzing, designing, developing, testing and maintaining a spatial information network software which have technical features of GIS, GNSS and RS. Meet the requirements of related industries.	<p>① <b>Classroom Teaching</b> : program design of Advance Computer Language C, Object-Oriented Programming B, Embedded Operating Systems, Internet Software Development; Intelligent terminal software development; Software Testing; Object-Oriented Software Engineering and UML; Curriculum design of Advanced Computer Language(C); Curriculum Design of Object-Oriented Programming; Curriculum Design of Data Structure A; Curriculum Design of Database; Practice of Geographic Information System B; Practice of Intelligent terminal software development; Comprehensive Practice of information network development; Practice of Navigation and positioning technology.</p> <p>② <b>Out-of-class Learning</b> : Encourage students to take the Computer Rank Examination and Software Engineer Examination. Carry out software skills competition, such as the “Blue Bridge Cup” and MAPGIS secondary development.</p>
4	Familiar with the network protocols and the policies, strategies and rules in the field of spatial information.	<p>① <b>Classroom Teaching</b> : Related professional courses</p> <p>② <b>Out-of-class Learning</b> : Browsing related websites and read refer to Trade Standards</p>
5	Understand the frontier theories, application prospect, development trends, industry needs in the field of Network and Spatial Information.	<p>① <b>Classroom Teaching</b> : Up-to-date Specialized Literature Searching , High Performance Computing , Social Media and Big Data, Computer Vision and Spatial Technologies , Data Mining and Data Analysis , Human-Computer Interaction Techniques</p> <p>② <b>Out-of-class Learning</b> : 3S Forum, invite scholars and experts to give academic lectures.</p>

No.	Graduation requirements	Ways to achieve (teaching process)
6	Have the basic skills of obtaining knowledge, questioning, problem analysis and problem solving. Have a certain capacity for scientific research and practical work. Meet the requirements of academic or higher education institutions.	<p>① <b>Classroom Teaching</b> : Study all professional basic courses and professional courses</p> <p>② <b>Out-of-class Learning</b> : Major competition, invention and creation, scientific research , such as organizing, students to participate in various competitions (The Challenge Cup, college students innovation and Entrepreneurship, etc...), Production-Study-Academic Research projects, science activities, graduation design, etc...</p>
7	Innovation and entrepreneurial ability	<p>① <b>Classroom Teaching</b>: Social investigation, innovation and entrepreneurship autonomous learning.</p> <p>② <b>Out-of-class Learning</b> : Inviting well-renowned entrepreneurs to deliver reports.</p>

**Major Disciplines:** Computer Science and Technology , Science and Technology of Surveying and Mapping

**Main Courses:** The Principles of Geographic Information System , Embedded Operating System, Design Principle of Spatial Information Service System, Internet Software Design, Information Network System, GNSS Principles and Applications, Computer Structure and Composing, An Introduction of Remote Sensing, Algorithms Design and Analysis, Digital Signal Processing B

**Lab Experiments:** The Principles of Geographic Information System , Internet Software Design, GNSS Principles and Applications, Computer Structure and Composing, Computer Graphics, Algorithms Design and Analysis, Digital Signal Processing B

**Practical Work:** Course Design for Computer High-Level Language C++, Course Design of Object-Oriented Programming , Course Design for Data structure A , Course Design for Database , Geographic Information System Practice , Intelligence Terminal Software Development Practice, Information Network Design Comprehensive Practice, Navigation and Orientation Practice, Graduation Design(Thesis)

**Duration:** Four years.

**Degree Granted:** Bachelor of Engineering

**Related Specialties:** Computer Science and Technology, Software Engineering



信息工程专业课程教学计划表

Course Descriptions of Information Engineering

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 Crs	学时 Hrs	学时分类 Class Hours		先修课程 Prerequisite courses	学期学分分配 Semester Credits							
					讲课 Lec.	实验 Lab.		一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
通识教育课 Liberal Education Courses	必修 Compulsory	11706200 马克思主义基本原理 Principles of Marxism	3	48	48				3						
		11706500 毛泽东思想与中国特色社会主义理论体系概论 Introduction to Mao Tse-tung Thought and the Theoretical System of Socialism with Chinese Characteristics	4	64	64						4				
		11711800 中国近现代史纲要 The Essentials of Modern Chinese History	2	32	32					2					
		120002*0 思想道德修养与法律基础 Morality Education and Fundamentals of Law	3	48	48			1.5	1.5						
		113076*0 体育 Physical Education	4	144	144			1	1	1	1				
		109116*0 大学英语（ABC） College English（ABC）	12	192	192			3	3	3	3				
		21919400 计算机高级语言程序设计(C++) High-level programming language (C++)	3.5	56	36	20		3.5							
		21114500 信息导论 Introduction to Information	1	16	16			1							
		14300100 军事理论 Military Theory	2	32	32			2							
	选修 Elective	总计 12 学分，含创新创业选修课学分，跨学科选修课不低于 6 学分	12	192											
		小计 Sum	46.5	824	612	20		12	8.5	6	8				
学科基础课 Disciplinary Fundamental Courses	212127*1	高等数学 A Advanced Mathematics A	11.5	184	184			5	6.5						
	21212801	线性代数 A Linear Algebra A	3.5	56	56			3.5							
	21906800	面向对象程序设计 B Object-Oriented Programming B	3	48	28	20			3						
	212130*3	大学物理 C College Physics C	6	96	96				3.5	2.5					
	21213202	物理实验 B Physics Experiments B	2	32		32			2						

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 Crs	学时 Hrs	学时分类 Class Hours		先修课程 Prerequisite courses	学期学分分配 Semester Credits							
					讲课 Lec.	实验 Lab.		一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
	20107300	自然地理与地质学 Physical Geography and Geology	2.5	40	40				2.5						
	21216502	离散数学 B Discrete Mathematics B	3.5	56	56					3.5					
	21908701	数据库概论 A Introduction to Database A	3.5	56	44	12				3.5					
	21915900	数据结构 A Data Structure A	4	64	48	16				4					
	21213501	概率论与数理统计 A Probability and Statics A	3.5	56	56					3.5					
	21123100	数字测量学 Digital Surveying	3.5	56	36	20					3.5				
	小计 Sum		46.5	744	644	100		8.5	17.5	17	3.5				
专业主干课 Main Specialty Courses	21114800	地理信息系统原理 Principles of Geographic Information Systems	3	48	28	20					3				
	21119700	嵌入式操作系统 Embedded Operating Systems	3	48	48						3				
	21112500	空间信息服务系统设计 Design Principle of Spatial Information Service Systems	2.5	40	40		地理信息系 统原理					2.5			
	21112700	互联网软件开发 Internet Software Development	3.5	56	40	16							3.5		
	211128200	信息网络系统 Information Network Systems	3	48	48							3			
	21123602	GNSS 原理及其应用 B GNSS Principles and Applications B	2.5	40	32	8							2.5		
	21121400	计算机结构与组成 Computer Structure and Composing	3.5	56	48	8				3.5					
	21117700	遥感原理与应用 Principles and Applications of Remote Sensing	2.5	40	40						2.5				
	21921301	计算机图形学 A Computer Graphics A	3.5	56	40	16						3.5			
	21117400	算法设计与分析 Algorithms Design and Analysis	2.5	40	32	8					2.5				
	21127801	数字信号处理 A Digital Signal Processing A	3	48	40	8					3				
	小计 Sum		32.5	520	436	84				3.5	14	9	6		
专业选修课 Specialty Elective Courses		具体见专业选修课列表	20	320											
合计 Sub-total			145.5	2408	1692	204		20.5	26	26.5	25.5	9	6		
Practic	44300200	军事训练 Military Training	2	2 周				2							

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 Crs	学时 Hrs	学时分类 Class Hours		先修课程 Prerequisite courses	学期学分分配 Semester Credits							
								一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
					讲课 Lec.	实验 Lab.									
	41919500	计算机高级语言课程设计 (C++) Projects of High-level programming language (C++)	1.5	1.5 周				1.5							
	41920200	面向对象程序设计课程设计 Projects of Object-Oriented Programming	1.5	1.5 周					1.5						
	40115300	自然地理与地质学实习 Practice of Physical Geography and Geology	2	2 周					2						
	41920901	数据结构课程设计 A Projects of Data structure A	2	2 周						2					
	41921200	数据库课程设计 Projects of Database	2	2 周						2					
	41123801	地理信息系统实习 A Practice of Geographic Information Systems A	2	2 周							2				
	41125000	智能终端软件开发实习 Practice of Intelligence Terminal Software Development	2	2 周								2			
	41127900	信息网络开发综合实习 Practice of Information Network Design Comprehensive	2	2 周								2			
	41128000	导航与定位技术实习 Practice of Navigation and Orientation	1.5	1.5 周									1.5		
	41122300	毕业设计 (论文) Graduation Design (Thesis)	16	16 周											16
	小计 Sum		34.5	34.5 周				3.5	3.5	4	2	4	1.5		16
创新创业自主学习 Freedom study	ZZ35S	社会调查 Social Investigation	2												
		其他(学科竞赛、发明创造、科研报告) Others (Contest, Invention, Innovation and Research Presentation)	3												
	小计 Sum		5												
总计 Total			185	2408+ 34.5 周	1692	204		24	29.5	30.5	27.5	13	7		16
可开出专业选修课列表 Specialty Elective Courses	21112800	智能终端软件开发 Intelligence Terminal Software Development	3	48	40	8	嵌入式操作系统					3			
	21119900	高性能计算 High Performance Computing	2.5	40	24	16						2.5			
	21917500	物联网技术与应用 Technologies and Applications of Internet of things	2.5	40	32	8	信息网络系统						2.5		
	21125100	地理空间信息服务 Geospatial Information Service	2	32	32								2		
	21128700	数字地球与智慧城市 Digital Earth and Smart City	2	32	20	12							2		

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 Crs	学时 Hrs	学时分类 Class Hours		先修课程 Prerequisite courses	学期学分分配 Semester Credits							
								一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
					讲课 Lec.	实验 Lab.									
	21122800	移动地理信息系统 Mobile GIS	2.5	40	28	12	地理信息系 统原理					2.5			
	21120000	空间信息工程技术 Spatial Information Engineering technologies	2.5	40	40		地理信息系 统原理						2.5		
	21123000	地理建模方法 Geographic Modeling Methods	2.5	40	24	16							2.5		
	21113500	信息工程专业前沿文献阅读 Up-to-date Specialized Literature Searching	2	32	32								2		
	21125800	社交媒体与大数据 Social Media and Big Data	2	32	24	8							2		
	21113900	多媒体信息系统 Multimedia Information Systems	2.5	40	28	12						2.5			
	21128100	计算机视觉与空间技术 Computer Vision and Spatial technologies	2.5	40	40								2.5		
	21122400	数据挖掘与数据分析 Data Mining and Data Analysis	2.5	40	24	16							2.5		
	21110600	遥感图像处理 Remote Sensing Image Processing	2.5	40	28	12	遥感原理与 应用					2.5			
	21122700	空间统计与分析 Spatial Statistics and Analysis	2.5	40	24	16						2.5			
	21905400	信息论与编码 A Information Theory and Coding A	3	48	40	8							3		
	21106500	软件测试 Software Testing	2	32	16	16							2		
	21125300	面向对象软件工程与 UML (B) Object-Oriented Software Engineering & UML (B)	2	32	24	8	面向对象程 序设计 B						2		
	21107200	软件项目管理 Software Project Management	2.5	40	40							2.5			
	21116400	人机交互技术 Human-Computer Interaction Techniques	2.5	40	24	16							2.5		
	21116500	设计模式 Design Patterns	2.5	40	24	16							2.5		
	21127400	3s 集成与应用 Integration and Application of GIS, RS and GPS	2	32	32									2	
	21910900	网络与信息安全 Networks and Information Security	2.5	40	40									2.5	
	21117600	Linux 内核设计 Linux core design	2.5	40	24	16								2.5	

注：通识教育选修课学分和创新创业自主学习学分未列入具体学期。

信息工程专业课程分类统计

	通识教育课程 Liberal Education Courses		学科基础课 Disciplinary Fundamental Courses	专业主干课 Main Specialty Courses	专业选修课 Specialty Elective Courses	实践环节 Practical Work	创新创业自主学习 Freedom Study	学时总计 Total Hour	学分总计 Total Credits
	必修	选修							
学时/ 学分	632/34.5	192/12	744/46.5	520/32.5	320/20	34.5 周 /34.5	5	2408+34.5 周	185
学分所 占比例	25.1%		25.1%	17.6%	10.8%	18.6%	2.7%		100%