# 地理信息科学 2021 版本科培养方案
# Undergraduate Education Plan for Specialty in Geographic Information Science (2021)

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| 专业名称 | 地理信息科学 | 主干学科 | 地理学、计算机科学与技术、遥感 |
| Major | Geographic Information Science | Major Disciplines | Geography, Computer science and technology, Remote Sensing |
| 计划学制 | 四 年 | 授予学位 | 理学学士 |
| Duration | 4 Years | Degree Granted | Bachelor of Science |

**最低毕业学分规定**
**Graduation Credit Criteria**

| **课程分类 Course Classification 课程性质 Course Nature** | 公共基础课程 Public Basic Courses | 通识教育课程 Public Courses | 大类课程 Basic Courses in General Discipline | 专业教育课程 Specialized Courses | 个性课程 Personalized Course | 集中性实践教学环节 Specialized Practice Schedule | 课外学分 Study Credit after Class | 总学分 Total Credits |
|---|---|---|---|---|---|---|---|---|
| 必修课 Required Courses | 31 | \ | 22.5 | 44 | \ | 22.5 | 10 | 180.0 |
| 选修课 Elective Courses | \ | 9 | \ | 25 | 6 | \ | 10 | |

## 一、 培养目标与毕业要求

## Ⅰ Educational Objectives &Requirement

### （一） 培养目标

本专业培养具有良好思想素质、社会责任感和职业道德，掌握地理信息科学的基础理论、专业知识、基本方法和实践技能，“适应能力强、实干精神强、创新意识强”，具有国际化视野，能够在空间信息、资源环境、国土规划、交通物流等行业从事科学研究、系统设计、技术开发、信息服务和规划管理等工作的卓越人才。

本专业期待毕业生五年后能达成下列目标：

（1）具有良好的思想品德、人文素养、敬业精神、社会责任感和职业道德，关注当代全球和社会问题，具有可持续发展意识。

（2）具备从事地理空间信息领域科学研究、系统设计和技术服务等工作所需的数学、地理学和其它相关自然科学知识，并能将数学和其它科学工具运用于解决工程问题。

（3）精通地理信息系统的工具和软硬件技术，具有在不同领域开展分析、设计、开发、测试和应用地理信息系统、遥感处理系统和全球定位系统的能力。

（4）具有良好的表达能力、沟通协调能力、团队意识和合作精神，具有独立思考，终身学习的能力。

（5）能够适应社会经济发展及行业转型升级需要，具备创新精神和国际化视野，能够推动地理信息科学领域的创新发展。

**I Education Objectives**

This major cultivate excellent talents who will have a good sense of ideological quality, social responsibility and professional ethics, master the fundamental theory, professional knowledge, basic methods and practical skills of Geographical Information Science, have strong “adaptive capacity”, “spirit of hardworking” and “consciousness of innovation”, and are able to work on scientific research, system design, technology development, information service and planning management in such fields as spatial information, resource and environment, territorial planning, and transportation logistics.

Students of this program are expected to achieve the following objectives 5 years after graduation：

（1）Have good morality, humanistic quality, professional spirit, social responsibility and professional ethics, focus on contemporary global and social issues, and have the consciousness of sustainable development.

（2）Have the required knowledge of mathematics, geography and other related natural sciences to work in the field of scientific research, system design and technical services, and be proficient in using mathematical and other scientific tools to solve engineering problems.

（3）Be proficient in various tools and software & hardware technologies of the geographic information system, have the ability to conduct the analysis, design, development, testing and application of geographic information system, remote sensing processing system and global positioning system in different practical fields.

（4）Have good expression skills, communication and coordination capability, good sense of team and cooperation spirit, as well as the ability of independent thinking and lifelong learning.

（5）Be capable of meeting the demand of social & economic development and industrial transformation and upgrading, have a good spirit of innovation and international version, and be able to promote innovative development in Geographical Information Science.

## （二） 毕业要求

(1) **工程知识:** 掌握从事本专业领域所需的数学、地理学、计算机科学、遥感、地图学和管理等知识。

(2) **问题分析:** 能够利用本专业的理论知识和工程基础知识进行自主发现、自主设计和自主解决与地理信息相关的科学问题，具有逻辑思维和辩证思维的能力、科学思维方法以及创新意识。

(3) **解决方案:** 掌握地理信息系统的设计语言和开发平台，理解地理信息系统的设计方法和步骤，能够设计和实现基于二次开发的应用系统，实现对地理信息的采集、组织、存储、共享、分析和表达。

(4) **研究:** 能够基于地理信息科学的原理对复杂的科学和工程问题进行研究，有效进行实验和模拟仿真设计与操作，并能够对实验结果进行分析和解释。

(5) **工具使用:** 掌握地理信息系统、遥感图像处理系统、导航定位系统的基本方法和技术，能够理解资源开发、环境保护、信息服务、国土规划、交通物流等领域中地理信息科学和技术的应用模式。

(6) **工程与社会:** 了解当代社会问题和社会需求，在工程和规划设计中综合考虑经济、环境、法律、安全和伦理等制约因素。

(7) **环境和可持续发展:** 能够理解和评价针对复杂工程问题的地理信息工程和规划实践对环境、社会可持续发展的影响。

(8) **职业规范:** 具有良好的思想素质、身体素质、心理素质、文化修养和社会责任感，能够在实践中理解并遵守工程职业道德和行为规范。

(9) **个人和团队:** 具有良好的团队意识和合作精神，能够在多学科背景下的团队中承担团队成员以及负责人的角色。

(10) **沟通:** 学生具有良好的口头和书面表达和交流能力，具备国际化视野，能够在跨文化背景下进行沟通和交流。

(11) **项目管理:** 理解并掌握地理信息系统项目管理原理与决策方法，并能在多学科环境中应用。

(12) **终身学习:** 具有进行终身学习的愿望和能力，掌握运用现代信息技术跟踪并获取信息的方法，熟悉并适应地理信息领域的发展动态和方向。

**II Graduation Requirement**

(1) **Engineering knowledge:** Master the relevant knowledge of mathematics, geography, computer science, remote sensing, cartography and management that required in the professional filed.

(2) **Problem analysis:** Be able to employ professional theories and knowledge and engineering knowledge to conduct independent discovery and design, and to independently resolve the related scientific problems in geographic information, and master the ability of logical thinking and dialectical thinking, the methods of scientific thinking, and the consciousness of innovation.

(3) **Design/development solution:** Master the design language and development platform of Geographic Information System, and the capability to understand the methods and steps in geographic information system design and to realize the acquisition, organization, storage, sharing, analysis and expression of geographic information.

(4) **Research:** Be able to conduct research on complex scientific and engineering problems based on the principles of Geographical Information Science, carry out experiments and simulation design and operation, and analyze and interpret the experimental results.

(5) **Usage of modern tools:** Master the basic methods and techniques of geographic information system, remote sensing image processing system, navigation and positioning system, and understand the mode of the application of Geographical Information Science in the field of resources exploitation, environment protection, information service, territorial planning and transportation logistics, etc.

(6) **Engineering and society:** Be familiar with the contemporary social demands and social issues, and be conscious of the economic, environmental, legal, safety and ethical constraints in engineering and planning design.

(7) **Environment and sustainable development:** Be able to understand and evaluate the impacts of the geographical information engineering and planning for complex engineering problems on the sustainability of environment and society.

(8) **Professional standards:** Have good ideological quality, physical quality, psychological quality, cultural cultivation and social responsibility, be able to understand and comply with engineering ethics and code of conduct in practices.

(9) **Individual and team:** Have a good sense of team and cooperation spirit, and be able to fulfill the role of either a member or a leader in a multi-disciplinary team.

(10) **Communication:** Have good oral and written expression and communication skills, have an international vision, and be able to communicate and exchange ideas in a cross-cultural context.

(11) **Project management:** Understand and master the management principles and decision-making methods of Geographical Information System projects, and be able to apply them in a multi-disciplinary context.

(12) **Life-long learning:** Have the desire and ability for lifelong learning, able to employ modern information technologies to track and acquire information, and be familiar with and adapt to the development frontiers and trends of Geographical Information Science.

表 1 培养目标的矩阵关系毕业要求支撑

| **毕业要求** | **培养目标 1** | **培养目标 2** | **培养目标 3** | **培养目标 4** | **培养目标 5** |
|---|---|---|---|---|---|
| 毕业要求 1 | | √ | √ | | |
| 毕业要求 2 | | √ | √ | √ | |
| 毕业要求 3 | | | √ | | √ |
| 毕业要求 4 | | √ | √ | | √ |
| 毕业要求 5 | | √ | √ | | √ |
| 毕业要求 6 | √ | √ | | | |
| 毕业要求 7 | √ | | √ | | |
| 毕业要求 8 | √ | | | √ | |
| 毕业要求 9 | | | √ | √ | |
| 毕业要求 10 | | | | √ | √ |
| 毕业要求 11 | | | √ | √ | |
| 毕业要求 12 | √ | | | √ | √ |

毕业要求的达成需以课程（教学环节）的教学活动为支撑。本专业为 合理设置课程体系、落实对毕业要求的支撑课程，对各项毕业要求进行了解。每项毕业要求（一级指标）被分解为若干层层递进的指标点（二级指标），前一指标点的达成是下一指标点达成的基础，而下一指标点的达成是前一指标点的升华，所有指标点一起，支撑了该毕业要求的达成。根据上述分解方法， 本专业各项毕业要求的指标点分解如下表所示。

表 2 毕业要求指标点的分解

| 毕业要求 | 指标点 |
| --- | --- |
| 毕业要求 1.工程知识:掌握从事本专业领域所需的数学、地理学、计算机科学、遥感、地图学和管理等知识。 | 1.1 掌握从事本专业领域所需的数学、地理学、计算机科学、遥感、地图学和管理等基础理论及知识。 |
| | 1.2 能够将相关知识和模型方法用于推演、分析地理信息和规划领域专业工程问题。 |
| | 1.3 能够将相关知识和模型方法用于地理信息和规划领域专业工程问题解决方案的比较和综合。 |
| 毕业要求 2.问题分析:能够利用本专业的理论知识和工程基础知识进行自主发现、自主设计和自主解决与地理信息相关的科学问题，具有逻辑思维和辩证思维的能力、科学思维方法以及创新意识。 | 2.1 能够运用相关科学原理，对复杂地理信息工程和规划问题的关键环节进行识别和判断。 |
| | 2.2 能够基于专业基础知识和模型方法对复杂地理信息工程和规划问题进行正确表达和分析。 |
| | 2.3 能够针对复杂地理信息工程和规划问题设计多种解决方案，并通过文献检完善和扩充解决方案。 |
| | 2.4 能运用所学知识分析地理信息工程的影响因素，证实解决方案的合理性。 |
| 毕业要求 3.解决方案:掌握地理信息系统的设计语言和开发平台，理解地理信息系统的设计方法和步骤，能够设计和实现基于二次开发的应用系统，实现对地理信息的采集、组织、存储、共享、分析和表达。 | 3.1 掌握地理信息系统的设计语言和开发平台。 |
| | 3.2 掌握地理信息工程和规划项目设计开发的方法与步骤。 |
| | 3.3 能够针对特定需求，设计和实现基于二次开发的应用系统，实现对地理信息的采集、组织、存储、共享、分析和表达。 |
| | 3.4 在地理信息系统和规划项目设计中考虑安全、健康、法律、文化及环境等制约因 |

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| | 素。 |
| 毕业要求 4.研究:能够基于地理信息科学的原理对复杂的科学和工程问题进行研究，有效进行实验和模拟仿真设计与操作，并能够对实验结果进行分析和解释。 | 4.1 能够基于科学原理，通过文献研究、实地调查、数据分析、系统模拟等方法，调研和分析复杂地理信息工程和规划问题的解决方案。 |
| | 4.2 能够根据研究对象的特征，选择研究路线和方法，设计调查或实验方案。 |
| | 4.3 能够根据调查或实验方案构建研究系统，安全地开展研究，正确地采集数据。 |
| | 4.4 能够对研究结果进行分析和解释，并得到合理有效的结论。 |
| 毕业要求 5.工具使用:掌握地理信息系统、遥感图像处理系统、导航定位系统的基本方法和技术，能够理解资源开发、环境保护、信息服务、国土规划、交通物流等领域中地理信息科学和技术的应用模式。 | 5.1 掌握地理信息系统、遥感图像处理系统、导航定位系统等现代空间信息技术的使用原理和方法。 |
| | 5.2 能够选择与使用恰当的专业仪器和软件，分析与解决复杂地理信息工程和规划问题。 |
| | 5.3 能够针对资源开发、环境保护、信息服务、国土规划、交通物流等领域中的特定需求选择效应的工具和技术。 |
| 毕业要求 6.工程与社会:了解当代社会问题和社会需求，在工程和规划设计中综合考虑经济、环境、法律、安全和伦理等制约因素。 | 6.1 了解地理信息和规划领域的技术标准体系、知识产权、产业政策和法律法规，了解不同社会文化和社会需求对地理信息工程活动的影响。 |
| | 6.2 能够分析和评价地理信息工程和规划实践与经济、社会、环境、法律、安全和文化的相互影响，并理解应承担的义务。 |
| 毕业要求 7.环境和可持续发展:能够理解和评价针对复杂工程问题的地理信息工程和规划实践对环境、社会可持续发展的影响。 | 7.1 理解环境保护和可持续发展的理念与内涵。 |
| | 7.2 能够评价地理信息工程和规划实践对环 |

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| | 境和社会可持续发展的影响。 |
| 毕业要求 8.职业规范:具有良好的思想素质、身体素质、心理素质、文化修养和社会责任感，能够在实践中理解并遵守工程职业道德和行为规范。 | 8.1 有正确价值观，理解个人与社会的关系，了解中国国情。 |
| | 8.2 具有良好的思想素质、身体素质、心理素质、文化修养和社会责任感，能够在实践中理解并遵守工程职业道德和行为规范，自觉履行责任。 |
| 毕业要求 9.个人和团队:具有良好的团队意识和合作精神，能够在多学科背景下的团队中承担团队成员以及负责人的角色。 | 9.1 能与其他学科的成员有效沟通，合作共事。 |
| | 9.2 能独立完成团队分配的工作，并与其他团队成员协作开展工作。 |
| | 9.3 能组织、协调和指挥团队开展工作。 |
| 毕业要求 10.沟通:学生具有良好的口头和书面表达和交流能力，具备国际化视野，能够在跨文化背景下进行沟通和交流。 | 10.1 能就专业问题，以口头、文稿、图表等方式，准确表达自己的观点，与业界同行和社会公众开展交流。 |
| | 10.2 了解地理信息和规划领域的国际发展趋势、研究热点，理解和尊重世界不同文化的差异性和多样性。 |
| | 10.3 能够在跨文化背景下进行沟通和交流。 |
| 毕业要求 11.项目管理:理解并掌握地理信息系统项目管理原理与决策方法，并能在多学科环境中应用。 | 11.1 掌握地理信息系统和规划工程项目中涉及的管理原理与经济决策方法。 |
| | 11.2 理解地理信息系统和规划工程项目中涉及的工程管理与经济决策问题，并能够应用于工艺设计、优化和生产管理等过程中。 |
| 毕业要求 12.终身学习:具有进行终身学习的愿望和能力，掌握运用现代信息技术跟踪并获取信息的方法，熟悉并适应地理信息领域的发展动态和方向。 | 12.1 能在行业和社会发展的大背景下，认识到自主学习和终身学习的必要性。 |
| | 12.2 掌握运用现代信息技术跟踪并获取信息的方法，熟悉并适应地理信息领域的发展动态和方向，具有自主学习和终身学习的能力。 |

## 二、专业核心课程与专业特色课程

## Ⅱ Core Course and Characteristic Courses

### （一） 专业核心课程

卫星导航定位原理与应用,地理信息系统概论,遥感原理与应用 B,空间分析 A,空间数据库原理,地理信息系统工程 B

Principles and Application of Satellite Navigation and Positioning, Introduction to Geographic Information System, Principles and Applications of Remote Sensing, Spatial Analysis, Spatial Database Principle, GIS Engineering

### （二） 专业特色课程

计量地理学,资源环境信息系统,定量遥感,网络 GIS,生态环境遥感,国土空间规划 GIS 应用,生态环境规划 C,矿山 GIS,人工智能与专家系统 B

Quantitative Geography, Resource and Environment Information System, Quantitative Remote Sensing, Web GIS, Eco-Environmental Remote Sensing, GIS Application in Territorial Spatial Planning, Ecological Environment Planning, Mine GIS, Artificial Intelligence and Expert System

**附：毕业要求实现矩阵**

| 专业核心课程 | 专业特色课程 | 课程名称 | 地理信息科学专业毕业要求 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | 1 | | | | 2 | | | | 3 | | | | 4 | | | | 5 | | | 6 | | 7 | | 8 | | | 9 | | | 10 | | | 11 | | | 12 | |
| | | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 1 | 2 | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 |
| | | 思想道德与法治 | | | | | | | √ | √ | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | √ |
| | | 中国近现代史纲要 | | | | | √ | | | | | | | √ | √ | | | | | | | | √ | | | √ | | | | | | | | | | | | √ | |
| | | 马克思主义基本原理 | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | | | √ |
| | | 毛泽东思想和中国特色社会主义理论体系概论 | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | | | | | | | | | √ | | √ | √ |
| | | 大学英 | | | | | | | | | | | | | | | | | | | | √ | | | | | | | √ | | √ | | | √ | | | | | |

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| | | 语 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 大学英语 2 | | | | | | | | | | | | | | | | | | √ | | | | | | | √ | | √ | | | √ | | | | |
| | | 大学英语 3 | | | | | | | | | | | | | | | | | | √ | | | | | | | √ | | √ | | | √ | | | | |
| | | 大学英语 4 | | | | | | | | | | | | | | | | | | √ | | | | | | | √ | | √ | | | √ | | | | |
| | | C 程序设计基础 A | | | | | | √ | | | | √ | | | | | | | √ | √ | | | | | | | | | | | | | | | | |
| | | 计算机基础与 C 程序设计综合实验 A | | | | | | √ | | | | √ | | | | | | | √ | √ | | | | | | | | | | | | | | | | |
| | | 军事技能训练 | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ | | | | | | | |
| | | 军事理论 | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ | | | | | | | |
| | | 体育 1 | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ | √ | √ | √ | | | √ | √ |
| | | 体育 2 | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ | √ | √ | √ | | | √ | √ |
| | | 体育 3 | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ | √ | √ | √ | | | √ | √ |
| | | 体育 4 | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ | √ | √ | √ | | | √ | √ |
| | | 专业导论 | √ | | | | | √ | | | √ | | | | | | | | | | | | | | | | | | | | | | | | √ | |
| | | 高等数学 A 上 | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 高等数学 A 下 | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 线性代数 | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 大学物理 B | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| | | 物理实验 B | | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | √ | | | | | |
| | | 概率论与数理统计 B | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| √ | | 卫星导航定位原理与应用 | √ | | | | | | √ | | | | | √ | | | √ | | | | | √ | | | | | | | | | | | | | | |
| | | 地图学 | | | | √ | | √ | | | √ | | | | | | | | | | √ | | | | | | | | | | | | | | | |
| | | 科技创业导论 | √ | | | | √ | | | | | | | | √ | | | | | | | | √ | | | | | | | | | | | | | |
| | | 地理科学概论 | √ | | √ | √ | | | | | | | | | | | | | | | | √ | | √ | | | | | | | | | | | | |
| √ | | 地理信 | | | √ | | | √ | | | | √ | | | | | | | | √ | | | | | | | | | | | | | | | | |

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| | | 息系统概论 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | GIS 程序设计语言 | | √ | | | | √ | | | | √ | | | | | | | | | | | | | | | √ | | | | | | | | √ | |
| | | 自然地理学 C | | | | | √ | √ | √ | | | | | | | | | | | | | √ | √ | | | | | | | | | | | | |
| | | 地质学 B | | | √ | √ | | | | | | | | | √ | | | | | | √ | | | | | | | | | | | | | | |
| √ | | 遥感原理与应用 B | | | | √ | | | √ | | | | | | | | √ | | | √ | | | | | | | | | | | | | | | |
| | √ | 计量地理学 | | √ | | | | | | | | | | √ | | | | | | | | √ | | | | | | √ | | | | | | | |
| √ | | 空间分析 A | | | | | | | | √ | | | | √ | | | | | | | | √ | | | | | | √ | | | | | | | |
| √ | | 空间数据库原理 | | | | | | | | | | | | | | | | √ | √ | √ | | | | | | | | | | | | √ | √ | √ | |
| √ | | 地理信息系统工程 B | | | | √ | | | | | | √ | | | | | | | | √ | | √ | | | | | | | | | | | √ | | |
| | √ | 资源环境信息系统 | | | | | | | | | | | √ | | | | | | √ | | | √ | √ | | | | | | | | | | | | |
| | √ | 定量遥感 | | | √ | | | √ | | | | | | | | | √ | √ | | | | | | | | | √ | | | | | | | | |
| | √ | 网络 GIS | √ | | | | | | | | | √ | | | | | | | | √ | | | | | | | | | | | | | | | √ |
| | | 资源工程 CAD(C) | √ | | | | | | | | | √ | | | | | | | √ | | | | | | | | | | | | | | | | |
| | | 人文地理学 D | √ | | | √ | | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | |
| | | GIS 算法与数据结构 B | | √ | | | | √ | | | | √ | | | √ | | | | | | | √ | | | | | | | | | | | | | |
| | | 区域调查研究方法 | | | | | | | √ | | | | | | | | √ | | | | | | | | | | √ | | | | | | | | |
| | | 灾害学 | | | √ | | √ | | | | | | | √ | | | | | | | √ | | | √ | | | | | | | | | | | |
| | √ | 生态环境遥感 | | | | | | | | | | | | √ | | | | √ | | | | | √ | | | | | | | | | | | | |
| | | 区域分析与规划 D | | | | | √ | | | | √ | | | | | | | | | | | | √ | | | √ | | | | √ | | | | | |
| | | 地理信息科学专业英 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | | √ |

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| | | 语 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | JAVA 语言开发 B | | | √ | | | | | √ | | | | | | | | | √ | | | | | | | | | | | | | | | | | |
| | √ | 国土空间规划 GIS 应用 | | | | √ | | | | | | | | √ | | | | | | | | | | √ | | | | | √ | | | | | | | |
| | | 区域资源与环境监测 | | | | | | | | | | √ | | | | | | √ | | | | | | | | | | | √ | √ | | | | | | |
| | | 城镇国土空间规划 | | | | | | | | | | | √ | | | | | | | | | √ | √ | | | | √ | | | | √ | | | | | |
| | √ | 生态环境规划 C | | | | | √ | | | | | | | | | | | | | | √ | √ | √ | √ | | | | | | | | | | | | |
| | | 自然资源学 | √ | | | √ | | | | | | | | √ | | | | | | | √ | | √ | | √ | | | | | | √ | | | | | |
| | | 经济地理学 A | | √ | | | | | √ | | | | √ | | | | | | | | √ | | | √ | | | | | | | | | | | | |
| | | 城市地理学 A | | | √ | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 房地产管理 | | | | | | | | | | | | | | | | | | | | √ | | | | √ | | | | | | | | √ | | |
| | √ | 矿山 GIS | | | | | | | | | √ | √ | | | | | | | | √ | √ | | | √ | | | | | | | | | | | | |
| | | GIS 进展与前沿 | | | | | | | | | | | | | | | | | | | √ | | √ | | | | | | | | | | | | | √ |
| | | 地理大数据分析 | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | √ | √ |
| | | 城乡规划管理与技术 | | | | | | | | | | | √ | | | | | | | | | √ | | | | √ | | | | | | | | | | |
| | | 虚拟现实与仿真 | | | | | | √ | | | | √ | | | | | | | √ | | | | | | | | | | | | | | | | | |
| | | 地理学方法与创新性思维 | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | |
| | √ | 人工智能与专家系统 B | | √ | | | √ | | | | | | | | √ | | | | | √ | | | | | | | | | | | √ | | | | | |
| | | GIS 应用技能训练 A | | | | √ | | | √ | | √ | | | | | | | | | √ | | | | | | | | | | | | | | | | |

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| | | 地理学综合实习 | | | | √ | | | √ | | | | | | | | | | | | | | √ | | | | √ | | | | | | | | |
| | | 地图学与遥感制图实习 B | | | √ | | | | √ | | | | | | | | | | √ | | | √ | | | | | | | | | | | | | |
| | | 创新创业能力拓展训练 | | | | | | | √ | | | | | | | | | √ | | √ | | | | | | | | | | √ | | | | √ | | |
| | | 地理信息系统工程综合实习 | | | | √ | | | √ | | | | | | | | | | | | | | | | | √ | | √ | | | | | | | | √ |
| | | 空间数据组织与管理实习 | | √ | | | | √ | | | | √ | | | | | | | | | | | | | | | √ | | | | | | | | √ | |
| | | 毕业实习 | | | | √ | √ | | | | | √ | | | | | √ | | | | | | | | | | | | | | | | | | √ | |
| | | 毕业论文 | | | | | | | √ | | | | | | | | | √ | | | √ | | | | | | | √ | | | √ | | | | | |

## 三、 教学建议进程表

## Ⅲ Course Schedule

(一)公共基础必修课程
1 Public Basic Compulsory Courses

| 开课单位 Course College | 课程编号 Course Number | 课程名称 Course Title | 学分 Crs | 学时分配 Including | | | | | | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 总学时 Tot hrs. | 理论 Theory | 实验 Exp. | 上机 Ope-ratio. | 实践 Prac-tice. | 课外 Extra-cur. | | |
| 马克思主义学院 | 4220001210 | 思想道德与法治 | 2.5 | 42 | 42 | 0 | 0 | 0 | 0 | 1 | |
| | | Morality and the rule of law | | | | | | | | | |
| 马克思主义学院 | 4220002180 | 中国近现代史纲要 | 2.5 | 42 | 42 | 0 | 0 | 0 | 0 | 2 | |
| | | Outline of Contemporary and Modern Chinese History | | | | | | | | | |
| 马克思主义学院 | 4220005180 | 马克思主义基本原理 | 2.5 | 42 | 42 | 0 | 0 | 0 | 0 | 3 | |
| | | Marxism Philosophy | | | | | | | | | |
| 马克思主义学院 | 4220003180 | 毛泽东思想和中国特色社会主义理论体系概论 | 4.5 | 66 | 66 | 0 | 0 | 0 | 0 | 4 | |
| | | Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics | | | | | | | | | |
| 外语学院 | 4030001210 | 大学英语 1 | 2 | 48 | 32 | 0 | 0 | 0 | 16 | 1 | |
| | | College English Ⅰ | | | | | | | | | |
| 外语学院 | 4030002210 | 大学英语 2 | 2 | 48 | 32 | 0 | 0 | 0 | 16 | 1 | 大学英语 1, |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | College English Ⅱ | | | | | | | | | |
| 外语学院 | 4030003210 | 大学英语 3 | 2 | 48 | 32 | 0 | 0 | 0 | 16 | 2 | 大学英语 2, |
| | | College English Ⅲ | | | | | | | | | |
| 外语学院 | 4030004210 | 大学英语 4 | 2 | 48 | 32 | 0 | 0 | 0 | 16 | 3 | 大学英语 3, |
| | | College English Ⅳ | | | | | | | | | |
| 计算机智能学院 | 4120001210 | C 程序设计基础 A | 2 | 32 | 32 | 0 | 0 | 0 | 0 | 1 | |
| | | Foundations of C Language Programming A | | | | | | | | | |
| 计算机智能学院 | 4120005210 | 计算机基础与 C 程序设计综合实验 A | 1 | 32 | 0 | 32 | 0 | 0 | 0 | 1 | |
| | | Comprehensive Experiments of Foundation of Computer and C Language Programming A | | | | | | | | | |
| 学工部 | 1050001210 | 军事技能训练 | 2 | 136 | 0 | 0 | 0 | 136 | 0 | 1 | |
| | | Military Skills Training | | | | | | | | | |
| 学工部 | 1050002210 | 军事理论 | 2 | 32 | 32 | 0 | 0 | 0 | 0 | 2 | |
| | | Military Theory | | | | | | | | | |
| 体育学院 | 4210001170 | 体育 1 | 1 | 32 | 32 | 0 | 0 | 0 | 0 | 1 | |
| | | Physical Education Ⅰ | | | | | | | | | |
| 体育学院 | 4210002170 | 体育 2 | 1 | 32 | 32 | 0 | 0 | 0 | 0 | 2 | |
| | | Physical Education Ⅱ | | | | | | | | | |
| 体育学院 | 4210003170 | 体育 3 | 1 | 32 | 32 | 0 | 0 | 0 | 0 | 3 | |
| | | Physical Education Ⅲ | | | | | | | | | |
| 体育学院 | 4210004170 | 体育 4 | 1 | 32 | 32 | 0 | 0 | 0 | 0 | 4 | |
| | | Physical Education Ⅳ | | | | | | | | | |
| 小 计 Subtotal | | | 31.0 | 744 | 512 | 32 | 0 | 136 | 64 | | |
| (二)通识教育选修课程<br>2 General Education Elective Courses | | | | | | | | | | | |
| 核心选修 Core elective courses | 文明与传统 Civilization and Tradition Courses | | 通识课程应修满至少 9 学分。自主选修课程中，至少在艺术与审美、创新与创业两个领域各选修 1 门课程。 Minimum subtotal credits: 9.Self-selected courses， at least 1 course in art and aesthetics and 1 course in innovation and entrepreneurship. | | | | | | | | |
| | 社会与发展类 Society and Development Courses | | | | | | | | | | |
| | 艺术与人文类 Art and Humanities Courses | | | | | | | | | | |
| | 自然与方法类 Nature and methods Courses | | | | | | | | | | |
| 自主选修 Core elective courses | 数学与自然科学,哲学与心理学,法学与社会科学,经济与管理,历史与文化,语言与文学,艺术与审美,创新与创业<br>Mathematics and Natural Sciences, Philosophy and Psychology, Science and Social Sciences, Economics and Management, History and Culture, Language and Literature, Art and Aesthetics, Innovation and Entrepreneurship | | | | | | | | | | |
| (三)大类必修课程<br>3 Basic Discipline Required Courses | | | | | | | | | | | |
| 资环学院 | 4060273130 | 专业导论 | 1 | 16 | 16 | 0 | 0 | 0 | 0 | 1 | |
| | | Introduction to Specialty | | | | | | | | | |
| 理学院 | 4050001210 | 高等数学 A 上 | 4.5 | 72 | 72 | 0 | 0 | 0 | 0 | 1 | |
| | | Advanced Mathematics AⅠ | | | | | | | | | |
| 理学院 | 4050002210 | 高等数学 A 下 | 5.5 | 88 | 88 | 0 | 0 | 0 | 0 | 2 | 高等数学 A 上, |
| | | Advanced Mathematics AⅡ | | | | | | | | | |
| 理学院 | 4050229110 | 线性代数 | 2.5 | 40 | 40 | 0 | 0 | 0 | 0 | 2 | |
| | | Linear Algebra | | | | | | | | | |
| 理学院 | 4050463130 | 大学物理 B | 5 | 80 | 80 | 0 | 0 | 0 | 0 | 2 | |
| | | College Physics | | | | | | | | | |
| 理学院 | 4050224110 | 物理实验 B | 1 | 32 | 0 | 32 | 0 | 0 | 0 | 3 | 大学物理 B, |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Physics Experiment | | | | | | | | | |
| 理学院 | 4050058110 | 概率论与数理统计 B | 3 | 48 | 48 | 0 | 0 | 0 | 0 | 3 | 高等数学 A 上, |
| | | Probability and Mathematical Statistics | | | | | | | | | |
| 小 计 Subtotal | | | 22.5 | 376 | 344 | 32 | 0 | 0 | 0 | | |
| (四)专业必修课程<br>4 Specialized Required Courses | | | | | | | | | | | |
| 资环学院 | 4060038210 | 卫星导航定位原理与应用 | 3.0 | 48 | 22 | 10 | 0 | 16 | 0 | 2 | |
| | | Principles and Application of Satellite Navigation and Positioning | | | | | | | | | |
| 资环学院 | 4060039210 | 地图学 | 3.0 | 48 | 32 | 16 | 0 | 0 | 0 | 2 | |
| | | Cartography | | | | | | | | | |
| 创业学院 | 4270003210 | 科技创业导论 | 1 | 16 | 16 | 0 | 0 | 0 | 0 | 2 | |
| | | Introduction to technology entrepreneurship | | | | | | | | | |
| 资环学院 | 4060320130 | 地理科学概论 | 2 | 32 | 32 | 0 | 0 | 0 | 0 | 3 | |
| | | Introduction to Geography | | | | | | | | | |
| 资环学院 | 4060040210 | 地理信息系统概论 | 3.0 | 48 | 24 | 24 | 0 | 0 | 0 | 3 | 地图学, |
| | | Introduction to Geographic Information System | | | | | | | | | |
| 资环学院 | 4060001110 | GIS 程序设计语言 | 3.5 | 56 | 32 | 24 | 0 | 0 | 0 | 3 | |
| | | GIS Programming Language | | | | | | | | | |
| 资环学院 | 4060440170 | 自然地理学 C | 2 | 32 | 32 | 0 | 0 | 0 | 0 | 3 | |
| | | Physical Geography | | | | | | | | | |
| 资环学院 | 4060441170 | 地质学 B | 2 | 32 | 32 | 0 | 0 | 0 | 0 | 4 | |
| | | Geology | | | | | | | | | |
| 资环学院 | 4060442170 | 遥感原理与应用 B | 3.5 | 56 | 32 | 24 | 0 | 0 | 0 | 4 | |
| | | Principles and Applications of Remote Sensing | | | | | | | | | |
| 资环学院 | 4060355140 | 计量地理学 | 3 | 48 | 24 | 24 | 0 | 0 | 0 | 4 | 概率论与数理统计 B, |
| | | Quantitative Geography | | | | | | | | | |
| 资环学院 | 4060237120 | 空间分析 A | 3.0 | 48 | 24 | 24 | 0 | 0 | 0 | 4 | 地理信息系统概论, |
| | | Spatial Analysis | | | | | | | | | |
| 资环学院 | 4060068110 | 空间数据库原理 | 3.5 | 56 | 32 | 24 | 0 | 0 | 0 | 5 | |
| | | Spatial Database Principle | | | | | | | | | |
| 资环学院 | 4060227120 | 地理信息系统工程 B | 3.5 | 56 | 32 | 24 | 0 | 0 | 0 | 6 | 地理信息系统概论, |
| | | GIS Engineering | | | | | | | | | |
| 资环学院 | 4060041210 | 资源环境信息系统 | 3.0 | 48 | 32 | 16 | 0 | 0 | 0 | 6 | 地理信息系统概论, 遥感原理与应用 B, 空间数据库原理, |
| | | Resource and Environment Information System | | | | | | | | | |
| 资环学院 | 4060345130 | 定量遥感 | 2 | 32 | 16 | 8 | 0 | 8 | 0 | 6 | |
| | | Quantitative Remote Sensing | | | | | | | | | |
| 资环学院 | 4060113110 | 网络 GIS | 3.0 | 48 | 30 | 18 | 0 | 0 | 0 | 6 | 地理信息系统概论, |
| | | Web GIS | | | | | | | | | |
| 小 计 Subtotal | | | 44.0 | 704 | 444 | 236 | 0 | 24 | 0 | | |
| (五)专业选修课程<br>5 Specialized Elective Courses | | | | | | | | | | | |
| 资环学院 | 4060008220 | 资源工程 CAD(C) | 2 | 32 | 8 | 24 | 0 | 0 | 0 | 2 | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Resource Engineering CAD (C) | | | | | | | | | |
| 资环学院 | 4060451170 | 人文地理学 D | 3 | 48 | 32 | 16 | 0 | 0 | 0 | 3 | |
| | | Human Geography | | | | | | | | | |
| 资环学院 | 4060444170 | GIS 算法与数据结构 B | 3 | 48 | 24 | 24 | 0 | 0 | 0 | 4 | 地理信息系统概论, |
| | | Algorithms and Data Structures of GIS | | | | | | | | | |
| 资环学院 | 4060021210 | 区域调查研究方法 | 2.0 | 32 | 20 | 12 | 0 | 0 | 0 | 4 | |
| | | Aproaches in Regional Survey and Research | | | | | | | | | |
| 资环学院 | 4060125110 | 灾害学 | 2 | 32 | 32 | 0 | 0 | 0 | 0 | 5 | |
| | | Theory of Disaster | | | | | | | | | |
| 资环学院 | 4060395130 | 生态环境遥感 | 3 | 48 | 32 | 16 | 0 | 0 | 0 | 5 | 遥感原理与应用 B, |
| | | Eco-Environmental Remote Sensing | | | | | | | | | |
| 资环学院 | 4060446170 | 区域分析与规划 D | 3 | 48 | 24 | 24 | 0 | 0 | 0 | 5 | |
| | | Regional Analysis and Planning | | | | | | | | | |
| 资环学院 | 4060022210 | 地理信息科学专业英语 | 2.0 | 32 | 32 | 0 | 0 | 0 | 0 | 5 | 大学英语 1, |
| | | Professional English for GIS | | | | | | | | | |
| 资环学院 | 4060222120 | JAVA 语言开发 B | 2.0 | 32 | 16 | 0 | 16 | 0 | 0 | 5 | |
| | | JAVA Language Development | | | | | | | | | |
| 资环学院 | 4060023210 | 国土空间规划 GIS 应用 | 3.0 | 48 | 16 | 32 | 0 | 0 | 0 | 5 | 空间分析 A, |
| | | GIS Application in Territorial Spatial Planning | | | | | | | | | |
| 资环学院 | 4060504170 | 区域资源与环境监测 | 3 | 48 | 32 | 16 | 0 | 0 | 0 | 5 | |
| | | Regional Resources and Environment Monitor | | | | | | | | | |
| 资环学院 | 4060024210 | 城镇国土空间规划 | 3.0 | 48 | 32 | 16 | 0 | 0 | 0 | 6 | |
| | | Urban Territorial Spatial Planning | | | | | | | | | |
| 资环学院 | 4060316130 | 生态环境规划 C | 3 | 48 | 32 | 0 | 0 | 16 | 0 | 6 | |
| | | Ecological Environment Planning | | | | | | | | | |
| 资环学院 | 4060135110 | 自然资源学 | 3 | 48 | 48 | 0 | 0 | 0 | 0 | 6 | |
| | | Natural Resource | | | | | | | | | |
| 资环学院 | 4060318130 | 经济地理学 A | 2 | 32 | 24 | 8 | 0 | 0 | 0 | 6 | |
| | | Economic Geography | | | | | | | | | |
| 资环学院 | 4060447170 | 城市地理学 A | 2 | 32 | 24 | 8 | 0 | 0 | 0 | 7 | |
| | | Urban Geography | | | | | | | | | |
| 资环学院 | 4060030110 | 房地产管理 | 2.0 | 32 | 32 | 0 | 0 | 0 | 0 | 7 | |
| | | Real Estate Administration | | | | | | | | | |
| 资环学院 | 4060002220 | 矿山 GIS | 2 | 32 | 16 | 16 | 0 | 0 | 0 | 7 | 地理信息系统概论, |
| | | Mine GIS | | | | | | | | | |
| 资环学院 | 4060221110 | GIS 进展与前沿 | 2 | 32 | 32 | 0 | 0 | 0 | 0 | 7 | |
| | | Progress and Frontier of GIS | | | | | | | | | |
| 资环学院 | 4060025210 | 地理大数据分析 | 3.0 | 48 | 24 | 24 | 0 | 0 | 0 | 7 | |
| | | Geographical Big Data Analysis | | | | | | | | | |
| 资环学院 | 4060026210 | 城乡规划管理与技术 | 2.0 | 32 | 32 | 0 | 0 | 0 | 0 | 7 | |
| | | Urban & Rural Planning Management and Technology | | | | | | | | | |
| 小 计 Subtotal | | | 52.0 | 832 | 564 | 236 | 16 | 16 | 0 | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 要求至少选修 25 学分。<br>Minimum subtotal credits:25 | | | | | | | | | | | |
| (六)个性课程<br>6 Personalized Elective Courses | | | | | | | | | | | |
| 资环学院 | 4060445170 | 虚拟现实与仿真 | 2 | 32 | 16 | 16 | 0 | 0 | 0 | 5 | |
| | | Virtual Reality and Simulation | | | | | | | | | |
| 资环学院 | 4060323130 | 地理学方法与创新性思维 | 2 | 32 | 32 | 0 | 0 | 0 | 0 | 7 | |
| | | Geography Method and Creative Thinking | | | | | | | | | |
| 资环学院 | 4060449170 | 人工智能与专家系统 B | 2 | 32 | 16 | 16 | 0 | 0 | 0 | 7 | |
| | | Artificial Intelligence and Expert System | | | | | | | | | |
| 小 计 Subtotal | | | 6.0 | 96 | 64 | 32 | 0 | 0 | 0 | | |
| 学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分（其中以上课程至少选修 4 学分）。<br>Students can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits (at least 4 credits from theabove courses). | | | | | | | | | | | |
| (七)专业教育集中性实践教育环节<br>7 Specialized Practice Schedule | | | | | | | | | | | |
| 资环学院 | 4060255120 | GIS 应用技能训练 A | 2.0 | 32 | 0 | 0 | 0 | 32 | 0 | 3 | 地理信息系统概论, |
| | | Application Skill Training on GIS | | | | | | | | | |
| 资环学院 | 4060450170 | 地理学综合实习 | 2 | 32 | 0 | 0 | 0 | 32 | 0 | 4 | |
| | | Comprehensive Practice of Geography | | | | | | | | | |
| 资环学院 | 4060282130 | 地图学与遥感制图实习 B | 2 | 32 | 0 | 0 | 0 | 32 | 0 | 4 | 地图学,遥感原理与应用 B, |
| | | Practice of Cartography and Remote sensing Mapping | | | | | | | | | |
| 资环学院 | 4060520170 | 创新创业能力拓展训练 | 2 | 32 | 0 | 0 | 0 | 32 | 0 | 5 | 科技创业导论, |
| | | Innovation and Entrepreneurship Ability Development Training | | | | | | | | | |
| 资环学院 | 4060262120 | 地理信息系统工程综合实习 | 2.0 | 32 | 0 | 0 | 0 | 32 | 0 | 6 | 地理信息系统工程 B, |
| | | GIS Engineering General Practice | | | | | | | | | |
| 资环学院 | 4060298130 | 空间数据组织与管理实习 | 2 | 32 | 0 | 0 | 0 | 32 | 0 | 6 | 空间数据库原理, |
| | | Practice of Spatial Data Organization and Management | | | | | | | | | |
| 资环学院 | 4060153110 | 毕业实习 | 2 | 32 | 0 | 0 | 0 | 32 | 0 | 8 | |
| | | Graduation Practice | | | | | | | | | |
| 资环学院 | 4060053210 | 毕业论文 | 8.5 | 272 | 0 | 0 | 0 | 272 | 0 | 8 | |
| | | Graduation Thesis | | | | | | | | | |
| 小 计 Subtotal | | | 22.5 | 496 | 0 | 0 | 0 | 496 | 0 | | |

## 四、 修读指导

## Ⅳ Recommendations on Course Studies

课外培养方案详见《武汉理工大学第二课堂课外学分实施办法》。《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个课外学分。

Please refer to the cultivation plan of the second class-Implementation Measures for Extracurricular Credits of the Second Class of Wuhan University of Technology. Situation & Policy (2 credits) and Mental Health Education (2 credits) are the required extracurricular courses.

**学院教学负责人：包申旭**

**专业培养方案负责人：夏琳**