武汉理工大学资源与环境工程学院

School of Resources & Environmental Engineering of Wuhan University of Technology

# 本科专业培养方案

# Undergraduate Program

**（Grade 2013）**

**武汉理工大学教务处**

Academic Affairs Office of Wuhan University of Technology

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# 人文地理与城乡规划专业本科培养方案
# Undergraduate Program for Specialty in Human Geography & Urban and Rural Planning

## 一、培养目标

## Ⅰ Educational Objectives

本专业培养具备人文地理和城乡规划管理的基本理论、知识和技能，具有创新精神和实践能力，接受严格科学思维的训练和良好的专业技能训练，立足于宏观、中观区域规划和土地管理，从事城乡建设与区域经济发展规划的研究、教学、开发或应用的高素质复合型专业人才。

This specialty cultivates high-quality compound specialized professionals with basic theories, knowledge and skills in human geography and urban-rural planning and management, having the spirit of innovation and t he ability of practice. After passing the training of rigorous scientific thinking and professional skill, based on the macro, meso regional planning and land management, graduates can engage in the work of research, teaching, developing, and application in urban-rural construction and regional economy development planning.

## 二、培养要求

## Ⅱ Educational Requirement

本专业学生主要学习并掌握人文地理与城乡规划专业的基本理论，基本知识和基本技能。

毕业生应获得以下几个方面的知识和能力：

1. 掌握人文地理与城乡规划的基本理论、基本知识和基本技能，了解人文地理学的理论与前沿发展、应用前景，了解相近专业如城市规划、环境科学和管理科学的一般原理和方法，了解城市规划、可持续发展战略等有关国家政策和法规，了解城乡规划管理的理论前沿、应用前景和最新发展；
2. 掌握人文地理、城乡规划等方面的研究和应用技术，具有较熟练的遥感、遥测和 GIS 技术的操作能力，掌握资料调查与收集、文献检索及运用现代技术获得相关信息的基本方法，具有分析、归纳、整理相关数据和撰写论文的能力；
3. 掌握高等数学基本知识与应用技能，掌握一门外语和计算机应用技能，达到规定的等级；
4. 接受良好的科学思维和科学方法的基本训练，具有创新意识、协同攻关能力及科学研究的初步能力；
5. 具备丰富的人文科学素养，具备健全的人格和健康的身心，具有较强的调查研究与决策能力、组织管理能力、口头与文字表达能力，具有较好的组织管理能力、较强的沟通能力、环境适应能力和团队合作能力。

Students in this major will learn the basic theories, knowledge and skills in human geography and urban-rural planning and management.

Graduates in this major should obtain following knowledge and ability:

1. Grasp the basic theories, knowledge and skills in human geography and urban-rural planning. Understand the theory, the leading edge developments and the application prospects of human geography. Find out the general principles and method of the relative fields, such as city planning, environmental science, and management science. Understand the national relevant policies and legislations that are relative to city planning and sustainable development strategy, etc. Understand the theoretical frontier, application prospects and recent developments of urban-rural planning and management;
2. Grasp the research and high-tech and applied technology of human geography and urban-rural planning. Be more skilled in the ability of operating remote sensing, remote measurement, and GIS technologies. Master the basic methodologies of investigation and data collection, document retrieval and application of modern technology to obtain relevant information. Have the ability of analyzing, inducting, and sorting out relative

data and the ability to write essays;

3. Acquire rudimentary knowledge and application skills of mathematics, a foreign language, and application techniques of computer science;

4. Receive basic good training in scientific thinking and the scientific thought. Have innovation consciousness, collaborative research ability and the preliminary ability of scientific research;

5. Possess abundant humanities accomplishment. Have a sound personality and physical and mental health. Has a strong research and decision-making ability, organizational management, oral and written expression skills. Have good organization and management ability, strong communication ability, environmental adaptability and team cooperation ability.

## 三、主干学科

## Ⅲ Major Disciplines

主干学科：地理学、规划类。

Major Disciplines：Geography, Urban and Rural Planning.

## 四、专业核心课程与专业特色课程

## Ⅳ Core Courses and Characteristic Courses

主要课程：地质学、自然地理学、人文地理学、经济地理、国土规划、地图学、遥感原理与应用、生态环境规划、地理信息系统原理与应用、城市总体规划、区域分析与规划、资源环境信息系统、城市详细规划。

Major Courses: Geology, Physical Geography, Human Geography, Economic Geography, Land Planning, Cartography, Principles and applications of Remote Sensing, Ecologic Environment Planning, Principles and Applications of Geographical Information System, Urban Comprehensive Planning, Regional Analyzing and Planning, Resource and Environmental Information System, Urban Detailed Planning .

专业特色课程：区域资源与环境实时监测、计量地理学、资源环境信息系统、遥感原理与应用、地理信息系统原理及应用。

Characteristic Courses: Regional Resources and Real-time Monitor, Quantitative Geography, Resource and Environmental Information System, Principles and Applications of Remote, GIS.

## 五、计划学制与学位

## Ⅴ Length of School and Degree

修业年限：四年

Duration: 4 years

授予学位：理学学士

Degree Conferred: Bachelor of Science

## 六、最低毕业学分规定

## Ⅵ Graduation Credit Criteria

| 课程类别 Course Classification / 课程性质 Course Nature | 通识课程 Public Basic Courses | 学科大类课程 Basic Courses in General Discipline | 专业课程 Courses in Specialty | 个性课程 Personalized Course | 集中性实践 Practice Courses | 课外学 Extracurricular Credits | 总学分 Total Credits |
|---|---|---|---|---|---|---|---|
| 必修课 Required Courses | 35 | 49 | 37.5 | | 23.5 | | 190 |
| 选修课 Elective Courses | 9 | 4 | 12 | 10 | | 10 | |

## 七、课程修读指导建议

## Ⅶ Recommendations on Course Studies

## 八、理论教学建议进程表

## Ⅷ Theory Course Schedule

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课程名称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 通识课程 Public Basic Courses | 必修课 Required Courses | 4220001110 | 思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law | 3 | 48 | | | 8 | | 1-6 | | |
| | | 4220002110 | 中国近现代史纲要 Outline of Contemporary and Modern Chinese History | 2 | 32 | | | | | 1-6 | | |
| | | 4220003110 | 毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics | 4 | 96 | | | 32 | | 1-6 | | |
| | | 4220005110 | 马克思主义基本原理 Marxism Philosophy | 3 | 48 | | | 8 | | 1-6 | | |
| | | 1060003130 | 军事理论 Military Theory | 1 | 32 | | | 16 | | 1 | | |
| | | 1050001130 | 心理健康教育 Mental health education | 1 | 16 | | | | | 1-2 | | |
| | | 4210001110 | 体育 1 Physical Education Ⅰ | 1 | 32 | | | | | 1 | | |
| | | 4210002110 | 体育 2 Physical Education Ⅱ | 1 | 32 | | | | | 2 | 体育 1 | |
| | | 4210003110 | 体育 3 Physical Education Ⅲ | 1 | 32 | | | | | 3 | 体育 2 | |
| | | 4210004110 | 体育 4 Physical Education Ⅳ | 1 | 32 | | | | | 4 | 体育 3 | |
| | | 4030002110 | 大学英语 A1 College English A Ⅰ | 3 | 64 | | | | 16 | 1 | | |
| | | 4030003110 | 大学英语 A2 College English A Ⅱ | 3 | 64 | | | | 16 | 2 | 大学英语 A1 | |
| | | 4030004110 | 大学英语 A3 College English A Ⅲ | 3 | 64 | | | | 16 | 3 | 大学英语 A2 | |
| | | 4030005110 | 大学英语 A4 College English A Ⅳ | 3 | 64 | | | | 16 | 4 | 大学英语 A3 | |
| | | 4120017110 | 大学计算机基础 Foundation of Computer | 2 | 32 | | 12 | | | 1 | | |
| | | 4120023110 | 计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C Language) | 3 | 48 | | 12 | | | 2 | | |
| | | 小 计 Subtotal | | 35 | 736 | | 24 | 64 | 64 | | | |
| | 选修课 Elective Courses | 创新创业类 Innovation and Entrepreneurship Courses | 全校学生要求至少取得 9 学分，建议在每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively. | | | | | | | | | |
| | | 人文社科类 Arts and Social Science Courses | | | | | | | | | | |
| | | 经济管理类 Economy and Management Courses | | | | | | | | | | |
| | | 科学技术类 Science and Technology Courses | | | | | | | | | | |
| | | 艺术体育类 Art and Physical Education Courses | | | | | | | | | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 学科大类课程 Basic Disciplinary Courses | 必修课 Required Courses | 4060127110 | 专业导论<br>Introduction to Materials Physics | 1 | 16 | | | | | 1 | | |
| | | 4050063110 | 高等数学 A 上<br>Advanced Mathematics AⅠ | 5 | 80 | | | | | 1 | | |
| | | 4050229110 | 线性代数<br>Linear Algebra | 2.5 | 40 | | | | | 1 | | |
| | | 4050064110 | 高等数学 A 下<br>Advanced Mathematics AⅡ | 5 | 80 | | | | | 2 | 高等数学 A 上 | |
| | | 4060027110 | 地质学<br>Physical Geology | 2.5 | 40 | | | | | 2 | | |
| | | 4060218120 | 自然地理学<br>Physical Geography | 2.5 | 40 | | | | | 2 | | |
| | | 4060219120 | 地图学<br>Cartography | 4 | 64 | 24 | | | | 2 | | |
| | | 4050057110 | 概率论与数理统计 A<br>Probability and Mathematics A | 4.5 | 72 | | | | | 3 | | |
| | | 4050463130 | 大学物理 B<br>Physics B | 4.5 | 72 | | | | | 3 | | |
| | | 4060320130 | 地理科学概论<br>Introduction to Geography | 2 | 32 | | | | | 4 | | |
| | | 4060122110 | 遥感原理与应用<br>Principles and Applications of Remote Sensing | 3.5 | 56 | 24 | | | | 4 | | |
| | | 4050224110 | 物理实验 B<br>Physics Lab. B | 1 | 32 | 32 | | | | 4 | 大学物理 B | |
| | | 4060001110 | GIS 程序设计语言<br>GIS Programming Language | 3.5 | 56 | 24 | | | | 4 | | |
| | | 4060228120 | 地理信息系统原理与应用<br>Principles and Applications of Geographical Information System | 4 | 64 | 28 | | | | 4 | 地图学 | |
| | | 测量课程（二选一，3.5 学分）<br>Surveying course cluster (Select one course, 3.5 credits) | | | | | | | | | | |
| | | 4060272120 | GPS 原理及测量应用<br>GPS Principle and Its Application in Surveying | 3.5 | 56 | | 10 | 16 | | 3 | | |
| | | 4060241120 | 矿山测量<br>Mining Geodesy | 3.5 | 56 | | 10 | 16 | | 3 | 地质学 | |
| | | 小 计 Subtotal | | 49 | 800 | 132 | 10 | 16 | | | | |
| | 选修课 Elective Courses | 4060128110 | 资源工程 CAD<br>Resource Engineering CAD | 2 | 32 | 24 | | | | 2 | | |
| | | 4060125110 | 灾害学<br>Disaster Science | 2 | 32 | | | | | 3 | 地质学<br>自然地理学 | |
| | | 4060277130 | 虚拟现实技术<br>Virtual Reality | 2 | 32 | 16 | | | | 3 | | |
| | | 4060030110 | 房地产管理<br>Real Estate Administration | 2 | 32 | | | | | 4 | | |
| | | 小 计 Subtotal | | 8 | 128 | 40 | | | | | | |
| | | 修读说明：要求至少选修 4 学分。<br>NOTE：Minimum subtotal credits:4. | | | | | | | | | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 专业课程 Specialized Courses | 必修课 Required Courses | 4060303130 | 人文地理学<br>Human Geography | 3.5 | 56 | 16 | | | | 5 | | |
| | | 4060068110 | 空间数据库原理<br>Spatial Database Principle | 3.5 | 56 | 24 | | | | 5 | | |
| | | 4060287130 | 国土规划<br>Land Planning | 2.5 | 40 | | | | | 5 | | |
| | | 4060020110 | 城市总体规划<br>Comprehensive Urban Planning | 3 | 48 | | | | | 5 | | |
| | | 4060004110 | 计量地理学<br>Quantitative Geography | 3 | 48 | 24 | | | | 5 | | |
| | | 4060224120 | 城市系统工程<br>Urban Systems Engineering | 3 | 48 | 12 | | | | 5 | | |
| | | 4060316130 | 生态环境规划<br>Ecological Environment Planning | 3 | 48 | | | 16 | | 5 | | |
| | | 4060318130 | 经济地理学<br>Economic Geography | 2 | 32 | 8 | | | | 6 | | |
| | | 4060130110 | 资源环境信息系统<br>Resource Environment Information System | 3.5 | 56 | 24 | | | | 6 | 遥感原理与应用<br>地理信息系统原理与应用<br>空间数据库原理 | |
| | | 4060225120 | 城市详细规划<br>Urban Detailed Planning | 4 | 64 | | | 32 | | 6 | | |
| | | 4060253120 | 土地评价与土地管理<br>Land Estimating and Management | 3 | 48 | 24 | | | | 6 | 遥感原理与应用 | |
| | | 4060302130 | 区域分析与规划<br>Region Analyzing and Planning | 3.5 | 56 | 24 | | | | 7 | | |
| | | 小 计 Subtotal | | 37.5 | 600 | 150 | | 48 | | | | |
| | 选修课 Elective Courses | 4060060110 | 计算机图形学<br>Computer Graphics | 2 | 32 | 12 | | | | 3 | | |
| | | 4130134110 | 建筑设计初步 B<br>Preliminary Architectural Design B | 2 | 32 | | | | | 5 | | |
| | | 4060222120 | JAVA 语言开发<br>JAVA language | 2 | 32 | | 16 | | | 5 | | |
| | | 4060281130 | 地图设计与编绘<br>Map design and compilation | 3 | 48 | 40 | | | | 6 | 地图学 | |
| | | 4060321130 | 生态环境遥感<br>Eco-Environmental Remote Sensing | 3 | 48 | 16 | | | | 6 | | |
| | | 4060237120 | 空间分析<br>Spatial Analysis | 3 | 48 | 24 | | | | 6 | 地理信息系统原理与应用<br>空间数据库原理 | |
| | | 4060317130 | 区域资源与环境实时监测<br>Resources and Environmental Real-time Monitor | 3 | 48 | 16 | | | | 6 | | |
| | | 4060095110 | 旅游地理学<br>Tourism Geography | 2 | 32 | | | | | 6 | 自然地理学 | |
| | | 4060135110 | 自然资源学<br>Natural Resource | 3 | 48 | | | | | 6 | | |
| | | 4060065110 | 景观规划与管理<br>Landscape Planning and Management | 2 | 32 | | | | | 7 | 自然地理学 | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4130438130 | 城市地理学<br>Urban geography | 2 | 32 | | | | | 7 | | |
| | | 4060021110 | 城乡规划法规与管理<br>Urban and Rural planning Management | 2 | 32 | | | | | 7 | | |
| | | 4060100110 | 人工智能与专家系统<br>AI & ES | 2 | 32 | | | | | 7 | | |
| | | 小 计 Subtotal | | 30 | 480 | 108 | 16 | 96 | | | | |
| | | 修读说明：要求至少选修 12 学分。<br>NOTE：Minimum subtotal credits: 12. | | | | | | | | | | |
| 个性课 Personalized Course | 选修课 Elective Courses | 4060320130 | 现代城市规划理论流派<br>Schools of Modern City Planning Theory | 1 | 16 | | | | | 6 | | |
| | | 4060321130 | 武汉市自然地理综合分析方法<br>Comprehensive Analysis of Natural Geographical Method in Wuhan | 1 | 16 | | | | 12 | 2 | | |
| | | 4060322130 | 区域分析中的主要数学方法<br>Main Mathematical Methods of Regional Analysis | 2 | 32 | 16 | | | | 4 | | |
| | | 4060323130 | 地理学方法与创新性思维<br>Geography Method and Creative Thinking | 2 | 32 | | | | | 6 | | |
| | | 4060324130 | 定量遥感<br>Quantitative Remote Sensing | 2 | 32 | 8 | | 8 | | 6 | | |
| | | 小 计 Subtotal | | 8 | 128 | 24 | | 8 | 12 | | | |
| | | 修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 10 学分。<br>NOTE：Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 10. | | | | | | | | | | |

## 九、集中性实践教学环节建议进程表

## Ⅸ Practice Schedule

| 课程编号 Course Number | 实践环节名称 Practice Courses Name | 周数 Weeks | 学分 Crs | 建议修读学期 Suggested Term | 第二专业 Second Major |
|---|---|---|---|---|---|
| 1060002110 | 军事训练<br>Military Training | 3 | 1.5 | 1 | |
| 4060220120 | 地理地质认识实习<br>Practice of Understanding Geographic and Geology | 2 | 2 | 2 | |
| 4060282130 | 地图学与遥感制图实习<br>Practice of Cartographic and Remote sensing Cartography Experiment | 2 | 2 | 4 | |
| 4060174110 | 基础强化训练<br>Foundation Strengthening Training | 1 | 1 | 5 | |
| 4060196110 | 区域经济调查分析<br>Regional economic Investigation and Analysis | 2 | 2 | 6 | |
| 4060209110 | 资源与环境规划实习<br>Practice of Resources and Environmental Planning | 2 | 2 | 6 | |
| 4060190110 | 能力拓展训练<br>Ability Development Training | 1 | 1 | 6 | |
| 4060148110 | 毕业实习<br>Graduation Practice | 2 | 2 | 8 | |

| 课程编号<br>Course Number | 实践环节名称<br>Practice Courses Name | 周数<br>Weeks | 学分<br>Crs | 建议修读学期<br>Suggested Term | 第二专业<br>Second Major |
|---|---|---|---|---|---|
| 4060256120 | 毕业设计(论文)<br>Graduation Thesis | 15 | 10 | 8 | |
| 小　　计　Subtotal | | 30 | 23.5 | | |

## 十、其它要求

## Ⅹ Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

*Situation & Policy*, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term. The course will be arranged by the University Students' Affairs' Department in each school.

# 地理信息科学专业本科培养方案
# Undergraduate Program for Specialty in Geographic Information Science

## 一、培养目标

### Ⅰ Educational Objectives

本专业培养具备地理学基础知识，掌握地理信息系统的基础理论、基本知识和基本技能，接受严格科学思维的训练和良好的专业技能训练，能在科研、教学、企事业单位和政府相关部门从事地理信息科学的研究、教学、开发或应用的高素质复合型科技专门人才。

This specialty cultivates compound special talents of high-quality who possess basic knowledge of geography, who master fundamental theory, knowledge and skills of geographic information system, who accept strict training of scientific thought and good training of professional skills, who have the ability of researching, teaching, developing and applying Geo-information Science in relevant departments of scientific research, teaching, enterprise and public institutions and governments.

## 二、培养要求

### Ⅱ Educational Requirements

本专业学生主要学习并掌握地理信息科学专业的基本理论，基本知识和基本技能。

毕业生应获得以下几方面的知识和能力：

1. 掌握地理信息科学、信息科学、地球科学基本理论和基本知识；
2. 掌握地理信息系统空间分析方法与应用软件、遥感图像处理和地学信息提取技术、卫星导航定位系统原理与应用，具有空间分析和数学建模的基本能力；
3. 具有开阔的学术视野，了解地理信息系统与遥感领域研究发展前沿，能熟练地运用地理信息系统、遥感与卫星导航定位系统技术解决地理学中的信息采集、分析处理和决策支持相关问题；
4. 掌握一门外语和计算机应用技能，达到规定的等级；
5. 具备健全的人格和健康的身心，具有创新意识和协同攻关能力，能在教师指导下从事地理信息系统设计、开发或具体应用。

The students of this specialty mainly study and master the basic theories, knowledge and techniques of geographical information science.

The graduates should obtain knowledge and abilities in the following aspects:

1. Mater the basic theory and knowledge of geographical information science, information science and geosciences.

2. Master the spatial analysis method of geographical information system and utility software, processing of remote sensing image data, extraction technology of Geological information, principle and application of Compass Navigation Satellite System. Have the ability of spatial analysis and mathematical modeling.

3. Possess broad academic vision, understand development frontier of geographical information system and remote sensing field research. Solve relevant problems about information collection, analysis and process and decision support by expertly applying technology of geographical information system, remote sensing and satellite navigation system.

4. Master a foreign language and computer application skill to extend specified rank.

5. Equipped with perfect personality and healthy mind and body, possess the consciousness of innovation and collaborative research ability, and design, develop or apply geographical information system under the teacher’s guidance.

## 三、主干学科

## Ⅲ Major Disciplines

主干学科：地理学、计算机科学与技术、遥感

Major Disciplines：Geography, Computer science and technology, Remote Sensing.

## 四、专业核心课程与专业特色课程

## Ⅳ Core Courses and Characteristic Courses

专业核心课程：自然地理学、空间分析、地图学、空间数据库原理、遥感原理与应用、地理信息系统原理与应用、地理信息系统工程。

Core Courses: Physical Geography, Spatial Analysis, Cartography, Spatial Database Principle, Principles and Applications of Remote Sensing, Principles and Applications of Geographical Information System, and GIS Engineering.

专业特色课程：资源环境信息系统、计量地理学、矿山 GIS、城市系统工程

Characteristic：Resource Environment Information System, Quantitative Geography, Mine GIS Courses, and Urban Systems Engineering.

## 五、计划学制与学位

## Ⅴ Length of School and Degree

修业年限：四年

Duration： Four Years

授予学位：理学学士

Degree Granted: Bachelor of Science

## 六、最低毕业学分规定

## Ⅵ Graduation Credit Criteria

| 课程类别 Course Classification / 课程性质 Course Nature | 通识课程 Public Basic Courses | 学科大类课程 Basic Courses in General Discipline | 专业课程 Courses in Specialty | 个性课程 Personalized Course | 集中性实践 Practice Courses | 课外学 Extracurricular Credits | 总学分 Total Credits |
|---|---|---|---|---|---|---|---|
| 必修课 Required Courses | 35 | 49 | 32.5 | \ | 27.5 | | 190 |
| 选修课 Elective Courses | 9 | 4 | 13 | 10 | \ | 10 | |

## 七、课程修读指导建议

## Ⅶ Recommendations on Course Studies

## 八、理论教学建议进程表

## Ⅷ Theory Course Schedule

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 通识课程 Public Basic Courses | 必修课 Required Courses | 4220001110 | 思想道德修养与法律基础<br>Morals, Ethics and Fundamentals of Law | 3 | 48 | | | 8 | | 1-6 | | |
| | | 4220002110 | 中国近现代史纲要<br>Outline of Contemporary and Modern Chinese History | 2 | 32 | | | | | 1-6 | | |
| | | 4220003110 | 毛泽东思想和中国特色社会主义理论体系概论<br>Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics | 4 | 96 | | | 32 | | 1-6 | | |
| | | 4220005110 | 马克思主义基本原理<br>Marxism Philosophy | 3 | 48 | | | 8 | | 1-6 | | |
| | | 1060003130 | 军事理论<br>Military Theory | 1 | 32 | | | 16 | | 1 | | |
| | | 1050001130 | 心理健康教育<br>Mental health education | 1 | 16 | | | | | 1-2 | | |
| | | 4210001110 | 体育 1<br>Physical Education Ⅰ | 1 | 32 | | | | | 1 | | |
| | | 4210002110 | 体育 2<br>Physical Education Ⅱ | 1 | 32 | | | | | 2 | 体育 1 | |
| | | 4210003110 | 体育 3<br>Physical Education Ⅲ | 1 | 32 | | | | | 3 | 体育 2 | |
| | | 4210004110 | 体育 4<br>Physical Education Ⅳ | 1 | 32 | | | | | 4 | 体育 3 | |
| | | 4030002110 | 大学英语 A1<br>College English AⅠ | 3 | 64 | | | | 16 | 1 | | |
| | | 4030003110 | 大学英语 A2<br>College English A Ⅱ | 3 | 64 | | | | 16 | 2 | 大学英语 A1 | |
| | | 4030004110 | 大学英语 A3<br>College English A Ⅲ | 3 | 64 | | | | 16 | 3 | 大学英语 A2 | |
| | | 4030005110 | 大学英语 A4<br>College English A Ⅳ | 3 | 64 | | | | 16 | 4 | 大学英语 A3 | |
| | | 4120017110 | 大学计算机基础<br>Foundation of Computer | 2 | 32 | | 12 | | | 1 | | |
| | | 4120023110 | 计算机程序设计基础(C 语言)<br>Fundamentals of Computer Program Design(C | 3 | 48 | | 12 | | | 2 | | |
| | | | | | | | | | | | | |
| | | 小 计 Subtotal | | 35 | 736 | | 24 | 64 | 64 | | | |
| | 选修课 Elective Courses | 创新创业类<br>Innovation and Entrepreneurship Courses | 全校学生要求至少取得 9 学分，建议在每个类别中分别至少选修一门课程。<br>All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively. | | | | | | | | | |
| | | 人文社科类<br>Arts and Social Science Courses | | | | | | | | | | |
| | | 经济管理类<br>Economy and Management Courses | | | | | | | | | | |
| | | 科学技术类<br>Science and Technology Courses | | | | | | | | | | |
| | | 艺术体育类<br>Art and Physical Education Courses | | | | | | | | | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 学科大类课程 Basic Disciplinary Courses | 必修课 Required Courses | 4060215110 | 专业导论<br>Introduction to Materials Physics | 1 | 16 | | | | | 1 | | |
| | | 4050063110 | 高等数学 A 上<br>Advanced Mathematics AⅠ | 5 | 80 | | | | | 1 | | |
| | | 4050229110 | 线性代数<br>Linear Algebra | 2.5 | 40 | | | | | 1 | | |
| | | 4050064110 | 高等数学 A 下<br>Advanced Mathematics AⅡ | 5 | 80 | | | | | 2 | 高等数学 A 上 | |
| | | 4060027110 | 地质学<br>Physical Geology | 2.5 | 40 | | | | | 2 | | |
| | | 4060218120 | 自然地理学<br>Physical Geography | 2.5 | 40 | | | | | 2 | | |
| | | 4060219120 | 地图学<br>Cartography | 4 | 64 | 24 | | | | 2 | | |
| | | 4050057110 | 概率论与数理统计 A<br>Probability and Mathematics A | 4.5 | 72 | | | | | 3 | | |
| | | 4050463130 | 大学物理 B<br>College Physics B | 4.5 | 72 | | | | | 3 | | |
| | | 4060320130 | 地理科学概论<br>Introduction to Geography | 2 | 32 | | | | | 4 | | |
| | | 4050224110 | 物理实验 B<br>Physics Lab. B | 1 | 32 | 32 | | | | 4 | 大学物理 B | |
| | | 4060122110 | 遥感原理与应用<br>Principles and Applications of Remote | 3.5 | 56 | 24 | | | | 4 | | |
| | | 4060001110 | GIS 程序设计语言<br>GIS Programming Language | 3.5 | 56 | 24 | | | | 4 | | |
| | | 4060228120 | 地理信息系统原理与应用<br>Principles and Applications of Geographical Information System | 4 | 64 | 28 | | | | 4 | 地图学 | |
| | | 测量课程（二选一，3.5 学分）<br>Surveying course cluster (Select one course, 3.5 credits) | | | | | | | | | | |
| | | 4060272120 | GPS 原理及测量应用<br>GPS Principle and Its Application in | 3.5 | 56 | | 10 | 16 | | 3 | | |
| | | 4060241120 | 矿山测量<br>Mining Geodesy | 3.5 | 56 | | 10 | 16 | | 3 | 地质学 | |
| | | 小 计 Subtotal | | 49 | 800 | 132 | 10 | 16 | | | | |
| | 选修课 Elective Courses | 4060128110 | 资源工程 CAD<br>Resource Engineering CAD | 2 | 32 | 24 | | | | 2 | | |
| | | 4060125110 | 灾害学<br>Disaster Science | 2 | 32 | | | | | 3 | 地质学<br>自然地理学 | |
| | | 4060227130 | 虚拟现实技术<br>Virtual Reality | 2 | 32 | 16 | | | | 3 | | |
| | | 4060030110 | 房地产管理<br>Real Estate Administration | 2 | 32 | | | | | 4 | | |
| | | | | | | | | | | | | |
| | | 小 计 Subtotal | | 8 | 128 | 40 | | | | | | |
| | | 修读说明：要求至少选修 4 学分。<br>NOTE：Minimum subtotal credits: 4 . | | | | | | | | | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 专业课程 Specialized Courses | 必修课 Required Courses | 4060068110 | 空间数据库原理<br>Spatial Database Principle | 3.5 | 56 | 24 | | | | 5 | | |
| | | 4060004110 | 计量地理学<br>Quantitative Geography | 3 | 48 | 24 | | | | 5 | | |
| | | 4060003110 | GIS 算法与数据结构<br>Algorithms and Data Structures of GIS | 3.5 | 56 | 24 | | | | 5 | 地理信息系统原理与应用 | |
| | | 4060224120 | 城市系统工程<br>Urban Systems Engineering | 3 | 48 | 12 | | | | 5 | | |
| | | 4060237120 | 空间分析<br>Spatial Analysis | 3 | 48 | 24 | | | | 6 | 地理信息系统原理与应用 | |
| | | 4060321130 | 生态环境遥感<br>Eco-Environmental Remote Sensing | 3 | 48 | 16 | | | | 6 | | |
| | | 4060227120 | 地理信息系统工程<br>GIS Engineering | 3.5 | 56 | 24 | | | | 6 | 地理信息系统原理与应用<br>遥感原理与应用<br>空间数据库原理 | |
| | | 4060130110 | 资源环境信息系统<br>Resource Environment Information System | 3.5 | 56 | 24 | | | | 6 | 地理信息系统原理与应用<br>遥感原理与应用<br>空间数据库原理 | |
| | | 4060113110 | 网络 GIS<br>Web GIS | 3 | 48 | 18 | | | | 7 | 地理信息系统原理与应用 | |
| | | 4060239120 | 矿山 GIS<br>GIS of Mines | 3.5 | 56 | 20 | | | | 7 | 地理信息系统原理与应用 | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | 小 计 Subtotal | | 32.5 | 520 | 210 | | | | | | |
| | 选修课 Elective Courses | 4060060110 | 计算机图形学<br>Computer Graphics | 2 | 32 | 12 | | | | 3 | | |
| | | 4060248120 | 人文地理学<br>Human Geography | 2 | 32 | | | | | 5 | 自然地理学 | |
| | | 4060222120 | JAVA 语言开发<br>JAVA language | 2 | 32 | | 16 | | | 5 | | |
| | | 4060249120 | 生态环境规划<br>Ecological Environment Planning | 3 | 48 | | | 16 | | 5 | 自然地理学 | |
| | | 4060281130 | 地图设计与编绘<br>Map design and compilation | 3 | 48 | 40 | | | | 6 | 地图学 | |
| | | 4060247120 | 区域分析与规划<br>Region Analyzing and Planning | 4 | 64 | 24 | | | | 6 | | |
| | | 4060318130 | 经济地理学<br>Economic Geography | 2 | 32 | 8 | | | | 6 | 自然地理学 | |
| | | 4060135110 | 自然资源学<br>Natural Resource | 3 | 48 | | | | | 6 | 地质学 | |
| | | 4060221110 | GIS 进展与前沿<br>GIS Development | 2 | 32 | | | | | 7 | 地理信息系统原理与应用 | |
| | | 4060317130 | 区域资源与环境实时监测<br>Resources and Environmental Real-time | 3 | 48 | 16 | | | | 7 | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4060016110 | 城市规划管理及技术<br>Urban Planning Management and Technology | 2 | 32 | | | | | 7 | | |
| | | 4130438130 | 城市地理学<br>Urban geography | 2 | 32 | | | | | 7 | | |
| | | 4060100110 | 人工智能与专家系统<br>AI & ES | 2 | 32 | | | | | 7 | | |
| | | 小 计 Subtotal | | 32 | 512 | 94 | 16 | 16 | | | | |
| | | 修读说明：要求至少选修 13 学分。<br>NOTE：Minimum subtotal credits:13. | | | | | | | | | | |
| 个性课程 Personalized Course | 选修课 Elective Courses | 4060321130 | 武汉市自然地理综合分析方法<br>Comprehensive Analysis of Natural | 1 | 16 | | | | 12 | 2 | | |
| | | 4060322130 | 区域分析中的主要数学方法<br>Main Mathematical Methods of Regional | 2 | 32 | 16 | | | | 4 | | |
| | | 4060323130 | 地理学方法与创新性思维<br>Geography Method and Creative Thinking | 2 | 32 | | | | | 6 | | |
| | | 4060324130 | 定量遥感<br>Quantitative Remote Sensing | 2 | 32 | 8 | | 8 | | 6 | | |
| | | | | | | | | | | | | |
| | | 小 计 Subtotal | | 7 | 112 | 24 | | 8 | 12 | | | |
| | | 修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议第四学期选修课程。要求至少选修 10 学分。<br>NOTE：Students can choose any courses from the other specialties. Minimum subtotal credits: 10. | | | | | | | | | | |

## 九、集中性实践教学环节建议进程表

## Ⅸ Practice Schedule

| 课程编号 Course Number | 实践环节名称 Practice Courses Name | 周数 Weeks | 学分 Crs | 建议修读学期 Suggested Term | 第二专业 Second Major |
|---|---|---|---|---|---|
| 1060002110 | 军事训练<br>Military Training | 3 | 1.5 | 1 | |
| 4060220120 | 地理地质认识实习<br>Practice of Understanding Geographic and Geology | 2 | 2 | 2 | |
| 4060282130 | 地图学与遥感制图实习<br>Practice of Cartographic and Remote sensing Cartography Experiment | 2 | 2 | 4 | |
| 4060298130 | 空间数据组织与管理实习<br>Practice of Spatial Data Organization and Management | 2 | 2 | 5 | |
| 4060255120 | GIS 应用技能训练<br>Practical Training on GIS | 2 | 2 | 5 | |
| 4060262120 | 地理信息系统工程综合实习<br>Practice of GIS | 2 | 2 | 6 | |
| 4060322130 | 地理建模<br>Geographic modeling | 2 | 2 | 6 | |
| 4060194110 | 能力拓展训练<br>Ability Development Training | 2 | 2 | 6 | |
| 4060153110 | 毕业实习<br>Graduation Practice | 2 | 2 | 8 | |

| 课程编号<br>Course Number | 实践环节名称<br>Practice Courses Name | 周数<br>Weeks | 学分<br>Crs | 建议修读学期<br>Suggested Term | 第二专业<br>Second Major |
|---|---|---|---|---|---|
| 4060260120 | 毕业设计(论文)<br>Graduation Thesis | 15 | 10 | 8 | |
| 小　　计　Subtotal | | 34 | 27.5 | | |

## 十、其它要求

## Ⅹ Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

*Situation & Policy*, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term. The course will be arranged by the University Students' Affairs' Department in each school.

# 环境工程专业本科培养方案
# Undergraduate Program for Specialty in Environmental Engineering

## 一、业务培养目标

**Ⅰ. Educational Objectives**

本专业培养具备城市和城镇水、气、声、固体废物等污染防治、给排水工程和水资源保护等方面的知识，能在设计单位、科研单位、施工单位，工矿企业、环保部门、政府部门、经济管理部门、学校等从事设计、施工、管理、教育和研究开发方面工作的环境工程学科高级工程技术人才。

The program of Environmental Engineering aims to equip students with the knowledges that consist of the prevention of water，air，sound and solid pollution, water-supply and drainage engineering, conservation of water resources and so on. Graduates of the program are sought by design institute, scientific research institute, construction company, mine corporation, local, regional, and national environmental protection department, government agencies, university and so on.

## 二、业务培养要求

**Ⅱ. Educational Requirement**

本专业学生主要学习化学、工程制图、微生物学、电工学、环境监测、环境工程学科的基本理论和基本知识，受到外语、计算机技术及绘图、污染物监测和分析、工程设计、管理及规划方面的基本训练，具有环境科学技术和给水排水工程领域的科学研究、工程设计和管理规划方面的基本能力。

毕业生应获得以下几方面的知识和能力：

1．掌握无机化学、分析化学、物理化学、工程制图、微生物学、力学、电工学、环境监测与评价、环境工程学科的基本理论、基本知识；

2．掌握水污染控制工程、大气污染控制工程、噪声污染控制工程、固体废物处理处置与资源化工程的基本原理和设计方法；

3．具有污染物监测和分析、环境监测、环境质量评价、环境规划与管理的初步能力；

4．了解环境科学与技术的理论前言和发展动态；

5．掌握文献检索、资料查询的基本方法，具有初步的科学研究和实际工作能力。

6．熟练掌握一门外语，具有较强的读、写、听、说、译及信息获取与处理能力。

The courses of this major involve the basic theory and knowledge of environmental science and engineering that consist of Chemistry, Engineering Drawing, Microbiology, Electrotechnics, Environmental Monitoring and so on. Students will be trained in the field of English, computer technology, drawing, monitoring and analyzing of pollutants, engineering design, management and planning, and then they will have the ability of scientific research, engineering design and managing and planning in the field of environmental science technology and water-supply and drainage engineering.

The graduates awarded their bachelor degree must demonstrate that they have the capacities and knowledges as follows.

1. An ability to apply the fundamental environmental engineering principle and knowledge of Inorganic Chemistry, analytical chemistry, physical chemistry, engineering drawing, microbiology, mechanics, electrotechnics, environmental monitoring and assessing;

2. An ability for the design of water pollution control project, air pollution control project, noise pollution control project, disposing and resource project of solid waste;

3. The initial ability of monitoring and analyzing of pollutants, environmental monitoring, environmental quality assessment, environmental planning and managing;

4. A knowledge of the theory cutting-edge and developments of Environmental science and technology；

5. An ability to grasp the fundamental methods of literature researching and information assessing , and having the initial ability of science researching and working.

6. A grasp of a foreign language well, and the strong ability to reading, writing, listening, speaking, translating and information of getting and treating.

## 三、主干学科

## Ⅲ. Major Disciplines

主干学科：土木工程，化工与制药工程，生物工程。

Major Disciplines: Civil engineering, Chemical and Pharmaceutical Engineering,Biological Engineering.

## 四、专业核心课程与专业特色课程

## Ⅳ Core Courses and Characteristic Courses

专业核心课程：环境工程原理、环境工程微生物学、环境监测、水污染控制工程、大气污染控制工程、固体废物处理处置工程、环境质量评价。

Core Courses: Environmental Engineering Principle, Environmental Engineering Microbiology, Environmental Monitoring, Water Pollution Control Engineering, Air Pollution Control Engineering, Solid Waste Treatment and Disposal, Environmental Quality Assessment.

专业特色课程：水污染控制工程、大气污染控制工程、固体废物处理与处置工程、环境工程微生物学、环境质量评价。

Characteristic Courses: Water Pollution Control Engineering, Air Pollution Control Engineering, Solid Waste Treatment and Disposal Engineering, Environmental Engineering Microbiology, Environmental Quality Assessment.

## 五、学制与学位

## Ⅴ. Length of School and Degree

修业年限：四年

Duration： Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineer

## 六、最低毕业学分规定

## Ⅵ. Graduation Credit Criteria

| 课程类别 Course Classification / 课程性质 Course Nature | 通识课程 Public Basic Courses | 学科大类课程 Basic Courses in General Discipline | 专业课程 Courses in Specialty | 个性课程 Personalized Course | 集中性实践 Practice Courses | 课外学 Extracurricular Credits | 总学分 Total Credits |
|---|---|---|---|---|---|---|---|
| 必修课 Required Courses | 35 | 49 | 29.5 | \ | 29.5 | \ | 190 |
| 选修课 Elective Courses | 9 | 4 | 14 | 10 | \ | 10 | |

## 七、课程修读指导建议

## Ⅶ. Recommendations on Course Studies

## 八、理论教学建议进程表

## Ⅷ. Theory Course Schedule

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课程名称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 通识课程 Public Basic Courses | 必修课 Required Courses | 4220001110 | 思想道德修养与法律基础<br>Morals, Ethics and Fundamentals of Law | 3 | 48 | | | 8 | | 1-6 | | |
| | | 4220002110 | 中国近现代史纲要<br>Outline of Contemporary and Modern Chinese History | 2 | 32 | | | | | 1-6 | | |
| | | 4220003110 | 毛泽东思想和中国特色社会主义理论体系概论<br>Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics | 4 | 96 | | | 32 | | 1-6 | | |
| | | 4220005110 | 马克思主义基本原理<br>Marxism Philosophy | 3 | 48 | | | 8 | | 1-6 | | |
| | | 1060003130 | 军事理论<br>Military Theory | 1 | 32 | | | 16 | | 1 | | |
| | | 1050001130 | 心理健康教育<br>Mental health education | 1 | 16 | | | | | 1-2 | | |
| | | 4210001110 | 体育 1<br>Physical Education Ⅰ | 1 | 32 | | | | | 1 | | |
| | | 4210002110 | 体育 2<br>Physical Education Ⅱ | 1 | 32 | | | | | 2 | 体育 1 | |
| | | 4210003110 | 体育 3<br>Physical Education Ⅲ | 1 | 32 | | | | | 3 | 体育 2 | |
| | | 4210004110 | 体育 4<br>Physical Education Ⅳ | 1 | 32 | | | | | 4 | 体育 3 | |
| | | 4030002110 | 大学英语 A1<br>College English A 1 | 3 | 64 | | | | 16 | 1 | | |
| | | 4030003110 | 大学英语 A2<br>College English A Ⅱ | 3 | 64 | | | | 16 | 2 | 大学英语 A1 | |
| | | 4030004110 | 大学英语 A3<br>College English A Ⅲ | 3 | 64 | | | | 16 | 3 | 大学英语 A2 | |
| | | 4030005110 | 大学英语 A4<br>College English A Ⅳ | 3 | 64 | | | | 16 | 4 | 大学英语 A3 | |
| | | 4120017110 | 大学计算机基础<br>Foundation of Computer | 2 | 32 | | 12 | | | 1 | | |
| | | 程序设计语言课程组(三选一，3 学分)<br>Computer Program Design Language Courses(Choice One freely) | | | | | | | | | | |
| | | 4120023110 | 计算机程序设计基础(C 语言)<br>Fundamentals of Computer Program Design(C) | 3 | 48 | | 12 | | | 1-2 | | |
| | | 4120024110 | 计算机程序设计基础(FORTRAN 语言)<br>Fundamentals of Computer Program Design(FORTRAN) | 3 | 48 | | 12 | | | 2 | | |
| | | 4120025110 | 计算机程序设计基础(VB 语言)<br>Fundamentals of Computer Program Design(VB) | 3 | 48 | | 12 | | | 2 | | |
| | | 小　计 Subtotal | | 35 | 736 | | 24 | 64 | 64 | | | |
| | 选修课 Elective Courses | 创新创业类<br>Innovation and Entrepreneurship Courses | | 全校学生要求至少取得 9 学分，建议在每个类别中分别至少选修一门课程。<br>All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively. | | | | | | | | |
| | | 人文社科类<br>Arts and Social Science Courses | | | | | | | | | | |
| | | 经济管理类<br>Economy and Management Courses | | | | | | | | | | |

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including | | | | | | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extra-cur | 建议修读学期 Suggested Term | | |
| | | 科学技术类 Science and Technology Courses | | | | | | | | | | |
| | | 艺术体育类 Art and Physical Education Courses | | | | | | | | | | |
| 学科大类课程 Basic Disciplinary Courses | 必修课 Required Courses | 4060274130 | 专业导论 Introduction to Environmental Science | 1 | 16 | | | | | 1 | | |
| | | 4050063110 | 高等数学 A 上 Advanced Mathematics AⅠ | 5 | 80 | | | | | 1 | | |
| | | 4050064110 | 高等数学 A 下 Advanced Mathematics AⅡ | 5 | 80 | | | | | 2 | 高等数学 A 上 | |
| | | 4050207110 | 无机化学 B 上 Chemistry BⅠ | 3 | 48 | | | | | 1 | | |
| | | 4050208110 | 无机化学 B 下 Chemistry BⅡ | 1.5 | 24 | | | | | 2 | 无机化学 B 上 | |
| | | 4050209110 | 无机化学 B 实验上 Inorganic Chemistry B ExperimentⅠ | 1 | 24 | 24 | | | | 1 | | |
| | | 4050210110 | 无机化学 B 实验下 Inorganic Chemistry B ExperimentⅡ | 0.5 | 24 | 24 | | | | 2 | 无机化学 B 实验上 | |
| | | 4080041110 | 工程图学 B Engineering Drawing B | 4 | 64 | | 4 | | | 2 | | |
| | | 4050021110 | 大学物理 A 上 Physics AⅠ | 3.5 | 56 | | | | | 2 | | |
| | | 4050022110 | 大学物理 A 下 Physics AⅡ | 3.5 | 56 | | | | | 3 | 大学物理 A 上 | |
| | | 4050466130 | 物理实验 A 上 Physics Lab. AⅠ | 1 | 32 | 32 | | | | 3 | | |
| | | 4050467130 | 物理实验 A 下 Physics Lab. AⅡ | 1 | 32 | 32 | | | | 4 | 物理实验 A 上 | |
| | | 4050229110 | 线性代数 Linear Algebra | 2.5 | 40 | | | | | 2 | | |
| | | 4050251110 | 有机化学 C Organic Chemistry C | 3 | 48 | | | | | 3 | | |
| | | 4050252110 | 有机化学 C 实验 Organic Chemistry C Experiment | 0.5 | 16 | 16 | | | | 3 | | |
| | | 4050220110 | 物理化学 C Physical Chemistry C | 4 | 64 | | | | | 4 | | |
| | | 4050221110 | 物理化学 C 实验 Physical Chemistry C Experimental | 0.5 | 16 | 16 | | | | 4 | | |
| | | 4050058110 | 概率论与数理统计 B Probability and Mathematics B | 3 | 48 | | | | | 4 | | |
| | | 4050042110 | 分析化学 B Analytical Chemistry B | 2 | 32 | | | | | 3 | | |
| | | 4050043110 | 分析化学 B 实验 Analytical Chemistry B Experiment | 1.5 | 48 | 48 | | | | 3 | | |
| | | 计算机辅助制图课程（二选一，2 学分） CAD Courses(Choice One freely) | | | | | | | | | | |
| | | 4060128110 | 资源工程 CAD Resource Engineering CAD | 2 | 32 | | 20 | | | 4 | | |

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课程名称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4060039110 | 环境 CAD<br>Environmental CAD | 2 | 32 | | 20 | | | 4 | | |
| | | 小 计 Subtotal | | 49 | 872 | 184 | 28 | | | | | |
| | 选修课 Elective Courses | 4060040110 | 环境材料概论<br>Introduction to Environmental Materials | 2 | 32 | | | | | 3 | | |
| | | 4060129110 | 资源环境经济学<br>Resource and Environment Economics | 2 | 32 | | | | | 3 | | |
| | | 4050134110 | 流体力学 C<br>Fluid Mechanics D | 3 | 48 | 6 | | | | 4 | | |
| | | 4060097110 | 清洁生产工艺导论<br>Introduction of cleaner Production Technology | 2 | 32 | | | | | 4 | | |
| | | 小 计 Subtotal | | 9.0 | 144 | 6 | | | | | | |
| | | 修读说明：要求至少选修 4 学分。<br>NOTE：Minimum subtotal credits: 4. | | | | | | | | | | |
| 专业课程 Specialized Courses | 必修课 Required Courses | 4060289130 | 环境工程微生物学<br>Environmental Engineering Microbiology | 2 | 32 | | | | | 5 | | |
| | | 4060305130 | 水处理管网工程<br>WaterTreatment Pipe Network Engineering | 2.5 | 40 | | | | | 5 | | |
| | | 4050071110 | 工程力学 A<br>Engineering Mechanics A | 4 | 64 | 4 | | | | 5 | | |
| | | 4200290130 | 环境工程原理<br>Environmental Engineering Principle | 3 | 48 | 8 | | | | 5 | | |
| | | 4060292130 | 环境监测<br>Environmental Monitoring | 3 | 48 | | | | | 5 | 分析化学 B | |
| | | 4060307130 | 水污染控制工程<br>Water Pollution Control Engineering | 3.5 | 56 | | | | | 6 | | |
| | | 4060022110 | 大气污染控制工程<br>Air Pollution Control Engineering | 3.5 | 56 | | | | | 6 | | |
| | | 4060035110 | 固体废物处理处置工程<br>Solid Waste Treatment and Disposal Engineering | 2.5 | 40 | | | | | 6 | | |
| | | 4060296130 | 环境质量评价<br>Environmental Qulity Assessment | 3 | 48 | | | 16 | | 7 | | |
| | | 4060315130 | 物理污染控制工程<br>Physical Pollution Control Engineering | 2.5 | 40 | 8 | | | | 6 | 大学物理 A 上 | |
| | | | | | | | | | | | | |
| | | 小 计 Subtotal | | 29.5 | 472 | 20 | | 16 | | | | |
| | 选修课 Elective Courses | 4060041110 | 环境工程设计基础<br>Environmental Engineering Design | 2 | 32 | | | | | 5 | | |
| | | 4060110110 | 土建概论<br>Civil Engineering Introduction | 2 | 32 | | | | | 5 | | |
| | | 4060299130 | 空气污染气象学<br>Air pollution meteorology | 2 | 32 | | | | | 7 | | |
| | | 4060288130 | 环境毒理学<br>Environmental toxicology | 2 | 32 | | | | | 6 | | |

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including | | | | | | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extra-cur | 建议修读学期 Suggested Term | | |
| | | 4060134110 | 自然灾害学<br>Natural Disaster | 2 | 32 | | | | | 7 | | |
| | | 4060283130 | 工程管理概论<br>Project Management Introduction | 2 | 32 | | | | | 5 | | |
| | | 4060117110 | 现代环境测试技术<br>Modern Environmental Testing Technology | 2 | 32 | 12 | | | | 6 | | |
| | | 4060051110 | 环境科学专业英语<br>English for Environmental Science | 2 | 32 | | | | | 7 | | |
| | | 4060109110 | 水处理新工艺<br>New water Treatment Technology | 2 | 32 | | | | | 7 | | |
| | | 4060048110 | 环境化学 B<br>Environmental Chemistry B | 2 | 32 | | | | | 7 | | |
| | | 4060042110 | 环境工程施工及概预算<br>Environmental Project Budget | 2 | 32 | | | | | 7 | | |
| | | 4060115110 | 文献检索<br>Literature Searching | 1 | 16 | | | | | 6 | | |
| | | 4060046110 | 环境规划学<br>Environmental Planning | 2 | 32 | | | | | 7 | | |
| | | 4050155110 | 生物化学 C<br>Biological Chemistry C | 2 | 32 | | | | | 7 | | |
| | | 4060103110 | 生态工程学<br>Biology Engineering | 2 | 32 | | | | | 7 | | |
| | | 4060045110 | 环境管理与环境法规<br>Environmental Management and Laws | 2 | 32 | | | | | 7 | | |
| | | 小 计 Subtotal | | 31 | 496 | 12 | | | | | | |
| | | 修读说明：要求至少选修 15 学分<br>NOTE: Minimum subtotal credits: 15 | | | | | | | | | | |
| 个性课程 Personalized Course | 选修课 Elective Courses | 4060325130 | 环境监理概论<br>Introduction to Environmental Supervision | 2 | 32 | | | | | 6、7 | | |
| | | 4060326130 | 环境科学与工程前沿<br>Frontiers of Environmental Science and Engineering | 2 | 32 | | | | | 6 | | |
| | | 4060327130 | 环境监察概论<br>Introduction to Environmental Monitoring | 2 | 32 | | | | | 6、7 | | |
| | | 小 计 Subtotal | | 6 | 96 | | | | | | | |
| | | 修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 10 学分。<br>NOTE：Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 10. | | | | | | | | | | |

## 九、集中性实践教学建议进程表

## Ⅸ Practice Training Table

| 课程编号<br>Course Number | 实践环节名称<br>Practice Courses Name | 周数<br>Weeks | 学分<br>Crs | 建议修读学期<br>Suggested Term | 第二专业<br>Second Major |
|---|---|---|---|---|---|
| 1060002110 | 军事训练<br>Military Training | 3 | 1.5 | 1 | |
| 4060177110 | 基础强化训练<br>Foundation Strengthening Training | 1 | 1 | 4(暑期) | |
| 4060198110 | 认识实习<br>Understanding of Specialty | 1 | 1 | 3 | |
| 4060293130 | 环境监测综合实验<br>Environmental Monitoring Experiment | 1 | 1 | 5 | |
| 4060306130 | 水处理管网设计<br>Design on Water Treatment Pipe Network | 2 | 2 | 5 | |
| 4060309130 | 水污染控制综合实验<br>Experiment of Water pollution Control | 1 | 1 | 6 | |
| 4060156110 | 大气污染控制实验技术<br>Experiment Technic of Air pollution Control | 1 | 1 | 6 | |
| 4060165110 | 固体废物处理实验技术<br>Experiment Technic of Solid waste disposal | 1 | 1 | 6 | |
| 4060304130 | 水处理工艺设计<br>Design on Water Treatment Process | 2 | 2 | 6 | |
| 4060278130 | 车间除尘系统设计<br>Design on Workshop Dust Removal System | 1 | 1 | 6 | |
| 4060285130 | 固体废物处理工艺设计<br>Design on Solid Waste Treatment Process | 1 | 1 | 6 | |
| 4060311130 | 微生物学实验技术<br>Microbiology Experiment Technology | 1 | 1 | 6 | |
| 4060203110 | 生产实习<br>Practice of Specialty | 2 | 2 | 6 | |
| 4060193110 | 能力拓展训练<br>Ability to Develop Training | 1 | 1 | 7 | |
| 4060151110 | 毕业实习<br>Graduation Practice | 2 | 2 | 8 | |
| 4060259120 | 毕业设计（论文）<br>Graduation Design (Thesis) | 15 | 10 | 8 | |
| 小　　计　Subtotal | | 36 | 29.5 | | |

## 十、其它要求

## Ⅺ Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

*Situation & Policy*, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term . The course will be arranged by the University Students' Affairs' Department in each school.

# 环境科学专业本科培养方案
# Undergraduate Program for Specialty in Environmental Science

## 一、业务培养目标

## Ⅰ. Educational Objectives

本专业培养具备环境监测、环境评价和环境管理等方面的基本理论和实践技能，具有研发与设计水、气、声、固体废物等污染防治新技术的能力，能在科研设计单位、高等学校、企事业单位、环保部门、规划部门及政府部门等从事环境方面的科研及设计、教学、规划及管理等工作的高级专门人才。

The program of Environmental Science is designed to provide students with the knowledge that consist of the environmental monitoring, environmental evaluation, environmental management and so on. Graduates have the abilities of research and development of new pollution control technology, and they will be well-prepared for careers in academic institutions, educational institutions, planning department, and private and government agencies.

## 二、业务培养要求

## Ⅱ. Educational Requirement

本专业学生主要学习化学、生物学、环境监测、环境评价等方面的基本理论、基础知识和基本技能，受到水、气、固体废物等污染控制基础研究和应用基础研究、环境工程设计基础等方面的科学思维和科学实验的训练，具有环境科学方面的科学研究、规划评价和管理方面的基本能力。

毕业生应获得以下几方面的知识和能力：

1. 掌握数学、物理、化学和微生物等方面的基本理论和基本知识；
2. 掌握环境监测、环境评价和环境管理等方面的基本理论、基本知识和基本技能；
3. 具有水、气、声、固等污染控制新技术和新工艺的研发与设计能力；
4. 熟悉国家环境保护、自然资源合理利用、可持续发展、知识产权等有关政策和法规；
5. 具有一定的实验设计能力，分析整理实验结果的能力以及撰写科技报告的能力.；
6. 掌握资料查询、文献检索及运用现代信息技术获取相关信息的基本方法。

The undergraduate program is designed to help students develop the basic knowledge and capabilities on Chemistry, Biology, Environmental Monitoring, Environmental evaluation and so on, along with the development of skills in scientific thinking and scientific research of pollution control, and then they will have the ability of science research, planning and evaluation, management in the field of environmental science.

The students will obtain the following program outcomes at the time they graduate with their bachelor degree.

1. A grasp of the fundamental theory of mathematics, physics, chemistry and microbiology.

2. A grasp of the fundamental theory, basic knowledge and skills of environmental monitoring, environmental evaluation, environmental management and so on.

3. Be proficient in researching and developing the new technology in water pollution control, air pollution control, noise pollution control and solid waste treating and disposal.

4. Be familiar with the policies and regulations about environmental protection, rational use of natural resources, sustainable development and intellectual property.

5. An ability to design and conduct experiments, to analyze and interpret data, as well as to write a technical report or proposal in the filed of Environmental Science.

6. An ability to search literatures and relative information though modern information technology.

## 三、主干学科

## Ⅲ Major Disciplines & Major Courses

主干学科：环境自然科学，环境技术科学，环境人文社会科学。

Major Dicsiplines: Environmental Science, Environmental Science and Technology, the Environment of Humanities and Social Sciences.

## 四、专业核心课程与专业特色课程

## Ⅳ Core Courses and Characteristic Courses

专业核心课程：环境生态学、环境化学、环境生物学、环境监测、水污染控制基础、大气污染控制基础、固体废物处理处置基础、环境微生物学、环境质量评价等。

Core Courses: Environmental Ecology, Environmental Chemistry, Environmental Biology, Environmental Monitoring, Water Pollution Control, Air Pollution Control, Solid Waste Treatment and Disposal, Environmental Microbiology, Environmental Quality Assessment.

专业特色课程：环境化学、环境监测、水污染控制基础、大气污染控制基础、环境质量评价、环境微生物学

Characteristic Courses: Environmental Chemistry, Environmental Monitoring, Water Pollution Control, Air Pollution Control, Environmental Quality Assessment, Environmental Microbiology

## 五、计划学制与学位

## Ⅴ. Length of School and Degree

修业年限：四年

Duration： Four Years

授予学位：理学学士

Degree Granted: Bachelor of Science

## 六、最低毕业学分规定

## Ⅵ. Graduation Credit Criteria

| 课程类别 Course Classification / 课程性质 Course Nature | 通识课程 Public Basic Courses | 学科大类课程 Basic Courses in General Discipline | 专业课程 Courses in Specialty | 个性课程 Personalized Course | 集中性实践 Practice Courses | 课外学 Extracurricular Credits | 总学分 Total Credits |
|---|---|---|---|---|---|---|---|
| 必修课 Required Courses | 35 | 49 | 33.5 | \ | 24.5 | \ | 190 |
| 选修课 Elective Courses | 9 | 4 | 15 | 10 | \ | 10 | |

## 七、课程修读指导建议

## Ⅶ. Recommendations on Course Studies

## 八、理论教学建议进程表

## Ⅷ. Theory Course Schedule

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课程名称 Course Title | 学分 Crs | 学时分配 Including | | | | | | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extra-cur | 建议修读学期 Suggested Term | | |
| 通识课程 Public Basic Courses | 必修课 Required Courses | 4220001110 | 思想道德修养与法律基础<br>Morals, Ethics and Fundamentals of Law | 3 | 48 | | | 8 | | 1-6 | | |
| | | 4220002110 | 中国近现代史纲要<br>Outline of Contemporary and Modern Chinese History | 2 | 32 | | | | | 1-6 | | |
| | | 4220003110 | 毛泽东思想和中国特色社会主义理论体系概论<br>Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics | 4 | 96 | | | 32 | | 1-6 | | |
| | | 4220005110 | 马克思主义基本原理<br>Marxism Philosophy | 3 | 48 | | | 8 | | 1-6 | | |
| | | 1060003130 | 军事理论<br>Military Theory | 1 | 32 | | | 16 | | 1 | | |
| | | 1050001130 | 心理健康教育<br>Mental health education | 1 | 16 | | | | | 1-2 | | |
| | | 4210001110 | 体育 1<br>Physical Education Ⅰ | 1 | 32 | | | | | 1 | | |
| | | 4210002110 | 体育 2<br>Physical Education Ⅱ | 1 | 32 | | | | | 2 | 体育 1 | |
| | | 4210003110 | 体育 3<br>Physical Education Ⅲ | 1 | 32 | | | | | 3 | 体育 2 | |
| | | 4210004110 | 体育 4<br>Physical Education Ⅳ | 1 | 32 | | | | | 4 | 体育 3 | |
| | | 4030002110 | 大学英语 A1<br>College English A Ⅰ | 3 | 64 | | | | 16 | 1 | | |
| | | 4030003110 | 大学英语 A2<br>College English A Ⅱ | 3 | 64 | | | | 16 | 2 | 大学英语 A1 | |
| | | 4030004110 | 大学英语 A3<br>College English A Ⅲ | 3 | 64 | | | | 16 | 3 | 大学英语 A2 | |
| | | 4030005110 | 大学英语 A4<br>College English A Ⅳ | 3 | 64 | | | | 16 | 4 | 大学英语 A3 | |
| | | 4120017110 | 大学计算机基础<br>Foundation of Computer | 2 | 32 | | 12 | | | 1 | | |
| | | 程序设计语言课程组(三选一，3 学分)<br>Computer Program Design Language Courses(Choice One freely) | | | | | | | | | | |
| | | 4120023110 | 计算机程序设计基础(C 语言)<br>Fundamentals of Computer Program Design(C Language) | 3 | 48 | | 12 | | | 1-2 | | |
| | | 4120024110 | 计算机程序设计基础(FORTRAN 语言)<br>Fundamentals of Computer Program Design(FORTRAN Language) | 3 | 48 | | 12 | | | 1-2 | | |
| | | 4120025110 | 计算机程序设计基础(VB 语言)<br>Fundamentals of Computer Program Design(VB Language) | 3 | 48 | | 12 | | | 1-2 | | |
| | | 小 计 Subtotal | | 35 | 736 | | 24 | 64 | 64 | | | |
| | 选修课 Elective Courses | 创新创业类<br>Innovation and Entrepreneurship Courses | 全校学生要求至少取得 9 学分，建议在每个类别中分别至少选修一门课程。<br>All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively. | | | | | | | | | |
| | | 人文社科类<br>Arts and Social Science Courses | | | | | | | | | | |
| | | 经济管理类<br>Economy and Management Courses | | | | | | | | | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including | | | | | | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | | |
| | | 艺术体育类<br>Art and Physical Education Courses | | | | | | | | | | |
| 学科大类课程 Basic Disciplinary Courses | 必修课 Required Courses | 4060274130 | 专业导论<br>Introduction to Environmental Science | 1 | 16 | | | | | 1 | | |
| | | 4050063110 | 高等数学 A 上<br>Advanced Mathematics AⅠ | 5 | 80 | | | | | 1 | | |
| | | 4050064110 | 高等数学 A 下<br>Advanced Mathematics AⅡ | 5 | 80 | | | | | 2 | 高等数学 A 上 | |
| | | 4050207110 | 无机化学 B 上<br>Chemistry BⅠ | 3 | 48 | | | | | 1 | | |
| | | 4050208110 | 无机化学 B 下<br>Chemistry BⅡ | 1.5 | 24 | | | | | 2 | 无机化学 B 上 | |
| | | 4050209110 | 无机化学 B 实验上<br>Inorganic Chemistry B ExperimentⅠ | 1 | 24 | 24 | | | | 1 | | |
| | | 4050210110 | 无机化学 B 实验下<br>Inorganic Chemistry B ExperimentⅡ | 0.5 | 24 | 24 | | | | 2 | 无机化学 B 实验上 | |
| | | 4080041110 | 工程图学 B<br>Engineering Drawing B | 4 | 64 | | 4 | | | 2 | | |
| | | 4050229110 | 线性代数<br>Linear Algebra | 2.5 | 40 | | | | | 2 | | |
| | | 4050021110 | 大学物理 A 上<br>Physics AⅠ | 3.5 | 56 | | | | | 2 | | |
| | | 4050022110 | 大学物理 A 下<br>Physics AⅡ | 3.5 | 56 | | | | | 3 | 大学物理 A 上 | |
| | | 4050466130 | 物理实验 A 上<br>Physics Lab. AⅠ | 1 | 32 | 32 | | | | 3 | | |
| | | 4050467130 | 物理实验 A 下<br>Physics Lab. AⅡ | 1 | 32 | 32 | | | | 4 | 物理实验 A 上 | |
| | | 4050251110 | 有机化学 C<br>Organic Chemistry C | 3 | 48 | | | | | 3 | | |
| | | 4050252110 | 有机化学 C 实验<br>Organic Chemistry C Experiment | 0.5 | 16 | 16 | | | | 3 | | |
| | | 4050042110 | 分析化学 B<br>Analytical Chemistry B | 2 | 32 | | | | | 3 | | |
| | | 4050043110 | 分析化学 B 实验<br>Analytical Chemistry B Experiment | 1.5 | 48 | 48 | | | | 3 | | |
| | | 4050220110 | 物理化学 C<br>Physical Chemistry C | 4 | 64 | | | | | 4 | | |
| | | 4050221110 | 物理化学 C 实验<br>Physical Chemistry C Experimental | 0.5 | 16 | 16 | | | | 4 | | |
| | | 4050058110 | 概率论与数理统计 B<br>Probability and Mathematics B | 3 | 48 | | | | | 4 | | |
| | | 计算机辅助制图课程（二选一，2 学分）<br>CAD Courses(Choice One freely) | | | | | | | | | | |
| | | 4060128110 | 资源工程 CAD<br>Resource Engineering CAD | 2 | 32 | | 20 | | | 4 | | |
| | | 4060039110 | 环境 CAD<br>Environmental CAD | 2 | 32 | | 20 | | | 4 | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including | | | | | | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | | |
| | | 小 计 Subtotal | | 49 | 872 | 184 | 28 | | | | | |
| | 选修课 Elective Courses | 4060040110 | 环境材料概论<br>Introduction to Environmental Materials | 2 | 32 | | | | | 3 | | |
| | | 4060129110 | 资源环境经济学<br>Resource and Environment Economics | 2 | 32 | | | | | 3 | | |
| | | 4050134110 | 流体力学 C<br>Fluid Mechanics C | 3 | 48 | 6 | | | | 4 | | |
| | | 4060097110 | 清洁生产工艺导论<br>Introduction of cleaner Production Technology | 2 | 32 | | | | | 4 | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | 小 计 Subtotal | | 9 | 144 | 6 | | | | | | |
| | | 修读说明：要求至少选修 4 学分。<br>NOTE：Minimum subtotal credits: 4. | | | | | | | | | | |
| 专业课程 Specialized Courses | 必修课 Required Courses | 4060294130 | 环境生态学 A<br>Environmental Ecology A | 3 | 48 | 16 | | | | 5 | | |
| | | 4060291130 | 环境化学<br>Environment Chemistry A | 4 | 64 | 16 | | | | 5 | | |
| | | 4200014110 | 环境工程原理<br>Environmental Engineering Principle | 3 | 48 | 8 | | | | 5 | | |
| | | 4060292130 | 环境监测<br>Environmental Monitoring | 3 | 48 | | | | | 5 | 分析化学 B | |
| | | 4060388120 | 环境生物学<br>Environmental Biology | 2 | 32 | | | | | 6 | | |
| | | 4060308130 | 水污染控制基础<br>Water Pollution Control | 3 | 48 | | | | | 6 | | |
| | | 4060279130 | 大气污染控制基础<br>Air Pollution Control | 3 | 48 | | | | | 6 | | |
| | | 4060286130 | 固体废物处理处置基础<br>Solid Waste Treatment and Disposal | 2 | 32 | | | | | 5 | | |
| | | 4060296130 | 环境质量评价<br>Environmental Quality Assessment | 3 | 48 | | | 16 | | 7 | | |
| | | 4060234120 | 环境规划学<br>Environmental Planning | 3 | 48 | | | 16 | | 7 | | |
| | | 4060057110 | 环境微生物学<br>Environmental Microbiology | 2 | 32 | | | | | 5 | | |
| | | 4060315130 | 物理污染控制工程<br>Physical Pollution Control Engineering | 2.5 | 40 | 8 | | | | 6 | 大学物理 A 上 | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | 小 计 Subtotal | | 33.5 | 536 | 48 | | 32 | | | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including | | | | | | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | | |
| | 选修课 Elective Courses | 4060056110 | 环境土壤学<br>Environmental Soil | 2 | 32 | | | | | 6 | | |
| | | 4060218120 | 自然地理学<br>Physical Geography | 2.5 | 40 | | | | | 5 | | |
| | | 4060110110 | 水文学与水资源<br>Water Resources and Hydrology | 2 | 32 | | | | | 5 | | |
| | | 4060110110 | 空气污染气象学<br>Air pollution meteorology | 2 | 32 | | | | | 7 | | |
| | | 4060041110 | 环境工程设计基础<br>Environmental Engineering Design | 2 | 32 | | | | | 5 | | |
| | | 4060134110 | 自然灾害学<br>Natural Disaster | 2 | 32 | | | | | 7 | | |
| | | 4060288130 | 环境毒理学<br>Environmental toxicology | 2 | 32 | | | | | 6 | | |
| | | 4060051110 | 环境科学专业英语<br>English for Environmental Science | 2 | 32 | | | | | 7 | | |
| | | 4060117110 | 现代环境测试技术<br>Modern Environmental Testing Technology | 2 | 32 | 12 | | | | 6 | | |
| | | 4060295130 | 环境信息系统<br>Environmental Information System | 3 | 48 | | | 16 | | 6 | | |
| | | 4060042110 | 环境工程施工及概预算<br>Environmental Project Budget | 2 | 32 | | | | | 7 | | |
| | | 4060115110 | 文献检索<br>Literature Searching | 1 | 16 | | | | | 6 | | |
| | | 4060103110 | 生态工程学<br>Biology Engineering | 2 | 32 | | | | | 7 | | |
| | | 4050155110 | 生物化学 C<br>Biological Chemistry C | 2 | 32 | | | | | 7 | | |
| | | 4060045110 | 环境管理与环境法规<br>Environmental Management and Laws | 2 | 32 | | | | | 7 | | |
| | | 小 计 Subtotal | | 30.5 | 488 | 12 | | 16 | | | | |
| | | 修读说明：要求至少选修 15 学分<br>NOTE: Minimum subtotal credits: 15 | | | | | | | | | | |
| 个性课 Personalized Course | 选修课 Elective Courses | 4060325130 | 环境监理概论<br>Introduction to Environmental Supervision | 2 | 32 | | | | | 6、7 | | |
| | | 4060326130 | 环境科学与工程前沿<br>Frontiers of Environmental Science and Engineering | 2 | 32 | | | | | 6 | | |
| | | 4060327130 | 环境监察概论<br>Introduction to Environmental Monitoring | 2 | 32 | | | | | 6、7 | | |
| | | | | | | | | | | | | |
| | | 小 计 Subtotal | | 6 | 96 | | | | | | | |
| | | 修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 10 学分。<br>NOTE：Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 10. | | | | | | | | | | |

## 九、集中性实践教学建议进程表

## Ⅸ. Practice Training Table

| 课程编号<br>Course Number | 实践环节名称<br>Practice Courses Name | 周数<br>Weeks | 学分<br>Crs | 建议修读学期<br>Suggested Term | 第二专业<br>Second Major |
|---|---|---|---|---|---|
| 1060002110 | 军事训练<br>Military Training | 3 | 1.5 | 1 | |
| 4060175110 | 基础强化训练<br>Foundation Strengthening Training | 1 | 1 | 4(暑期) | |
| 4060197110 | 认识实习<br>Understanding of Specialty | 1 | 1 | 3 | |
| 4060293130 | 环境监测综合实验<br>Environmental monitoring experiment | 1 | 1 | 5 | |
| 4060323130 | 环境工程综合实验<br>Envirionmental Engineering Experiment | 1 | 1 | 6 | |
| 4060304130 | 水处理工艺设计<br>Design on Water Treatment Process | 1 | 1 | 6 | |
| 4060278130 | 车间除尘系统设计<br>Design on Workshop Dust Removal System | 1 | 1 | 6 | |
| 4060285130 | 固体废物处理工艺设计<br>Design on Solid Waste Treatment Process | 1 | 1 | 5 | |
| 4060311130 | 微生物学实验技术<br>Microbiology Experiment Technology | 1 | 1 | 6 | |
| 4060201110 | 生产实习<br>Practice of Specialty | 2 | 2 | 6 | |
| 4060191110 | 能力拓展训练<br>Ability to Develop Training | 1 | 1 | 7 | |
| 4060149110 | 毕业实习<br>Graduation Practice | 2 | 2 | 8 | |
| 4060257120 | 毕业设计（论文）<br>Graduation Design (Thesis) | 15 | 10 | 8 | |
| 小　　计　Subtotal | | 31 | 24.5 | | |

## 十、其它要求

## Ⅹ. Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

*Situation & Policy*, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term . The course will be arranged by the University Students' Affairs' Department in each school.

# 采矿工程专业本科培养方案
# Undergraduate Program for Specialty in Mining Engineering

## 一、业务培养目标

## Ⅰ Educational Objectives

本学科培养具备矿业工程学科的宽厚基础知识和专业基本技能，能在金属、非金属、化工和能源等行业从事采矿工程领域的科学研究、技术开发、行政管理、文化教育、项目规划与设计、基建施工和生产经营等方面的工作，适应社会主义市场经济发展的高级工程技术人才。

This major brings up the advanced engineering personnel with wide basic knowledge and specialty technology. Aim to undertake scientific research, technology exploitation, administration management, culture education, project planning and design, capital construction, production and management of mining engineering in metal, non metal, chemical industry and energy sources filed. All these help to adapt to socialism market economy development.

## 二、业务培养要求

## Ⅱ Educational Requirements

本学科学生主要学习采矿工程专业的基础理论，接受采矿工程师基本训练，获得采矿工程的规划、设计、施工及经营管理和工矿企业的安全环境检测与监测、安全监察与管理、安全设计与生产、安全教育与培训等方面的基本能力。

毕业生应获得以下几个方面的知识、能力和素质：

1. 具有良好的人文社会科学素养、较强的社会责任感和工程职业道德；

2. 具有从事采矿工程工作所需的相关数学、自然科学知识以及技术经济与工商管理初步知识，掌握矿业学科的基本知识和采矿工程专业的基础理论，受到采矿工程专业实验技能、工程实践、计算机应用、工程设计和科学研究方法的基本训练；

3. 具有综合运用所学科学理论和技术手段分析并解决工程问题的基本能力以及创新意识；

4. 熟悉国家有关矿产资源、安全生产、劳动保护和环境保护以及对于与本专业相关职业和行业的生产与管理、规划与设计、研究与开发等方面的方针、政策和法规，能正确认识工程对自然和社会的影响；

5. 掌握中、外文资料查询、文献检索及运用现代技术获取相关信息的基本方法，具有终生教育的意识和继续学习的能力；

6. 具有一定的组织管理能力、较强的表达能力和人际交往能力，具有国际视野和跨文化交流、竞争与合作能力。

Students of the subject will learn basic theory of mining engineering and safety engineering, undertake basic education of mining engineer, gain basic ability of planning, design, construction and management in mineral resources engineering, safety examination and monitoring, safety supervise and management, safety design and production, safety education for mine corporation.

Graduates must get the following knowledge, ability and accomplishment:

1. Having good humanistic community attainment, strong society responsibility consciousness and occupation morality;

2. Having mathematic knowledge, natural science knowledge and basic knowledge of management correlation to mineral resources engineering, predominating the basic knowledge of mining subject and basic theory of mining engineering, accepting basic training of experiment technology, engineering practice, computer application, engineering design, and science research method in mining engineering;

3. Having innovation consciousness and basic ability of solving engineering problem by applying theory and technology method;

4. Being familiar with country policy and law about mineral resources, safe production, safety protection and environment protection, relation with production and management, planning and design, study and exploitation etc of this major;

5. Understanding some basic methods to query information in Chinese or other languages, literature search, and get information by modern technology, having consciousness of all life education and ability of continued study;

6. Bearing some management ability, better expression ability and intercourse ability, bearing international view and ability of cross-cultural communication, competition and cooperation.

## 三、主干学科

## Ⅲ Major Disciplines

主干学科：矿业工程、力学

Major Disciplines: Mining Engineering, Mechanics

## 四、专业核心课程与专业特色课程

## Ⅳ Core Courses and Characteristic Courses

专业核心课程：理论力学、材料力学、流体力学、岩体力学、地质学、矿业系统工程、爆破工程、矿床露天开采、矿床地下开采、井巷与隧道工程、工矿通风与空调等。

专业基本课程：弹性力学 B、矿山测量、矿山地质与工程地质、采掘设备及其管理、矿山工程测试技术、矿床露天开采、矿床地下开采、矿山设计原理。

专业特色课程：矿山工程测试技术、爆破工程、井巷与隧道工程、工矿通风与空调、工程设计数字化训练。

Core Courses: Theoretical Mechanics, Mechanics of Materials, Fluid Mechanics, Rock Mechanics, Geology, Mining Systems Engineering, Blasting Engineering, Surface Mining, Underground Mining, Mine & Tunnel Engineering, Mine and Industrial Ventilation & Air-Conditioning etc.

Mining engineering Basic Courses: Mechanics of Elasticity, Mining Engineering Surveying, Mine geology and Engineering geology, Excavation Equipment and Management, Mine Engineering Testing Technology, Surface Mining, Underground Mining, Principles for Design of Mines.

Characteristic Courses: Mine Engineering Testing Technology, Blasting Engineering, Mine & Tunnel Engineering, Mine and Industrial Ventilation & Air-Conditioning, Engineering Design Digital Training .

## 五、计划学制与学位

## Ⅴ Length of School and Degree

修业年限：四年

Duration： Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineering

## 六、最低毕业学分规定

## Ⅵ Graduation Credit Criteria

| 课程类别 Course Classification / 课程性质 Course Nature | 通识课程 Public Basic Courses | 学科大类课程 Basic Courses in General Discipline | 专业课程 Courses in Specialty | 个性课程 Personalized Course | 集中性实践 Practice Courses | 课外学分 Extracurricular Credits | 总学分 Total Credits |
|---|---|---|---|---|---|---|---|
| 必修课 Required Courses | 35 | 41 | 37.5 | \ | 25.5 | \ | 190 |
| 选修课 Elective Courses | 9 | 6 | 16 | 10 | \ | 10 | |

## 七、课程修读指导建议

## Ⅶ Recommendations on Course Studies

## 八、理论教学建议进程表

## Ⅷ Theory Course Schedule

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课程名称 Course Title | 学分 Crs | 学时分配 Including | | | | | | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extra-cur | 建议修读学期 Suggested Term | | |
| 通识课程 Public Basic Courses | 必修课 Required Courses | 4220001110 | 思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law | 3 | 48 | | | 8 | | 1-6 | | |
| | | 4220002110 | 中国近现代史纲要 Outline of Contemporary and Modern Chinese History | 2 | 32 | | | | | 1-6 | | |
| | | 4220003110 | 毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics | 4 | 96 | | | 32 | | 1-6 | | |
| | | 4220005110 | 马克思主义基本原理 Marxism Philosophy | 3 | 48 | | | 8 | | 1-6 | | |
| | | 1060003130 | 军事理论 Military Theory | 1 | 32 | | | 16 | | 1-4 | | |
| | | 4210001110 | 体育 1 Physical Education Ⅰ | 1 | 32 | | | | | 1 | | |
| | | 4210002110 | 体育 2 Physical Education Ⅱ | 1 | 32 | | | | | 2 | 体育 1 | |
| | | 4210003110 | 体育 3 Physical Education Ⅲ | 1 | 32 | | | | | 3 | 体育 2 | |
| | | 4210004110 | 体育 4 Physical Education Ⅳ | 1 | 32 | | | | | 4 | 体育 3 | |
| | | 1050001130 | 心理健康教育 Mental Health Education | 1 | 16 | | | | | 1-2 | | |
| | | 4030002110 | 大学英语 A1 College English A 1 | 3 | 64 | | | | 16 | 1 | | |
| | | 4030003110 | 大学英语 A2 College English A Ⅱ | 3 | 64 | | | | 16 | 2 | 大学英语 A1 | |
| | | 4030004110 | 大学英语 A3 College English A Ⅲ | 3 | 64 | | | | 16 | 3 | 大学英语 A2 | |
| | | 4030005110 | 大学英语 A4 College English A Ⅳ | 3 | 64 | | | | 16 | 4 | 大学英语 A3 | |
| | | 4120017110 | 大学计算机基础 Foundation of Computer | 2 | 32 | | 12 | | | 1 | | |
| | | 程序设计语言课程组(三选一，3 学分) Courses of Computer Program Design (select one out of three, Credits: 3) | | | | | | | | | | |
| | | 4120023110 | 计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C) | 3 | 48 | | 12 | | | 2 | | |
| | | 4120024110 | 计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN) | 3 | 48 | | 12 | | | 2 | | |
| | | 4120025110 | 计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB) | 3 | 48 | | 12 | | | 2 | | |
| | | | | | | | | | | | | |
| | | 小 计 Subtotal | | 35 | 736 | | 24 | 64 | 64 | | | |

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extracur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 选修课 Elective Courses | 创新创业类 Innovation and Entrepreneurship Courses | | 全校学生要求至少取得 9 学分，建议在每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively. | | | | | | | | |
| | | 人文社科类 Arts and Social Science Courses | | | | | | | | | | |
| | | 经济管理类 Economy and Management Courses | | | | | | | | | | |
| | | 科学技术类 Science and Technology Courses | | | | | | | | | | |
| | | 艺术体育类 Art and Physical Education Courses | | | | | | | | | | |
| 学科大类课程 Basic Disciplinary Courses | 必修课 Required Courses | 4060212110 | 专业导论 Introduction to Specialty | 1 | 16 | | | | | 1 | | |
| | | 4050063110 | 高等数学 A 上 Advanced Mathematics A | 5 | 80 | | | | | 1 | | |
| | | 4050229110 | 线性代数 Linear Algebra | 2.5 | 40 | | | | | 1 | | |
| | | 4050064110 | 高等数学 A 下 Advanced Mathematics A | 5 | 80 | | | | | 2 | 高等数学 A 上 | |
| | | 4060027110 | 地质学 Physical Geology | 2.5 | 40 | | | | | 2 | | |
| | | 4080041110 | 工程图学 B Engineering Graphics B | 4 | 64 | | 4 | | | 2 | 线性代数 | |
| | | 4050057110 | 概率论与数理统计 A Probability and Mathematics A | 4.5 | 72 | | | | | 3 | | |
| | | 4050463130 | 大学物理 B Physics C | 5 | 80 | | | | | 3 | | |
| | | 4050224110 | 物理实验 B Physics Lab. B | 1 | 32 | 32 | | | | 4 | 大学物理 B | |
| | | 4050012110 | 电工与电子技术基础 C Fundamentals of Electrical Engineering & Electric C | 4 | 64 | 10 | | | | 4 | | |
| | | 4050220110 | 物理化学 C Physical Chemistry C | 3 | 48 | | | | | 4 | | |
| | | 测量课程组（二选一，3.5 学分） Surveying courses (Choice one freely,Crs:3.5) | | | | | | | | | | |
| | | 4060241120 | 矿山测量 Mining Geodesy | 3.5 | 56 | | 10 | 16 | | 3 | | |
| | | 4060272120 | GPS 原理及测量应用 GPS Principle and Its Application in | 3.5 | 56 | | 10 | 16 | | 3 | | |
| | | 小 计 Subtotal | | 41 | 672 | 42 | 24 | 16 | | | | |
| | 选修课 Elective Courses | 4060128110 | 资源工程 CAD Resource Engineering CAD | 2 | 32 | | 24 | | | 2 | | |
| | | 4060118110 | 虚拟现实技术 Virtual Reality | 2 | 32 | 12 | | | | 3 | | |
| | | 4060124110 | 灾害防治理论与技术 Calamity Prevention theory and technology | 2 | 32 | | | | | 3 | | |
| | | 4060091110 | 矿业工程项目管理 Engineering project management | 2 | 32 | | | | | 3 | | |
| | | 4060125110 | 灾害学原理 Disaster Science | 2 | 32 | | | | | 3 | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4060301130 | 矿业技术经济学<br>Mining Economics | 2 | 32 | | | | | 4 | | |
| | | 4060129110 | 安全管理学<br>Safety Management | 2 | 32 | | | | | 4 | | |
| | | 4060324130 | 安全心理学<br>Safety Psychology | 2 | 32 | | | 8 | | 4 | | |
| | | 4060100110 | 人工智能与专家系统<br>AI & ES | 2 | 32 | | | | | 4 | | |
| | | 小 计 Subtotal | | 18 | 288 | 12 | 24 | 8 | | | | |
| | | 修读说明：要求至少选修 6 学分。<br>NOTE：Minimum subtotal credits: 6. | | | | | | | | | | |
| 专业课程 Specialized Courses | 必修课 Required Courses | 4050535130 | 理论力学 B<br>Theoretical Mechanics B | 3.5 | 56 | | | | | 4 | | |
| | | 4080061110 | 机械设计基础<br>Foundation of Machine Design | 3.5 | 56 | 6 | | | | 5 | | |
| | | 4050018110 | 材料力学 C<br>Mechanics of Materials C | 4 | 64 | 4 | | | | 5 | 理论力学 B | |
| | | 4050136110 | 流体力学 D<br>Fluid Mechanics D | 2 | 32 | 6 | | | | 5 | 理论力学 B | |
| | | 4060014110 | 爆破工程<br>Blasting Engineering | 2.5 | 40 | | | | | 5 | 理论力学 B | |
| | | 4060121110 | 岩体力学<br>Rock Mechanics | 2.5 | 40 | | | | | 5 | 理论力学 B | |
| | | 4060071110 | 矿床露天开采<br>Surface Mining | 2 | 32 | | | | | 6 | 材料力学 C | |
| | | 4060070110 | 矿床地下开采<br>Underground Mining | 2 | 32 | | | | | 6 | 材料力学 C | |
| | | 4060236120 | 井巷与隧道工程<br>Mine & Tunnel Engineering | 2 | 32 | | | | | 6 | 岩体力学 | |
| | | 4060077110 | 矿山地质与工程地质<br>Mining Geology & Engineering Geology | 2 | 32 | | | | | 6 | | |
| | | 4060078110 | 矿山工程测试技术<br>Testing Techniques in mining | 2 | 32 | | | | | 6 | | |
| | | 4060230120 | 工矿通风与空调<br>Mine and Industry Ventilation & Air-Conditioning | 2 | 32 | | | | | 7 | 矿床地下开采 | |
| | | 4060081110 | 矿山提升与运输<br>Mine Lift and Transportation | 2 | 32 | | | | | 7 | 矿床地下开采 | |
| | | 4060131110 | 资源数字化技术<br>Digital Mine | 2 | 32 | | | | | 7 | | |
| | | 4060300130 | 矿山设计原理<br>Principles for Design of Mines | 3.5 | 56 | | | 28 | | 7 | | |
| | | 小 计 Subtotal | | 37.5 | 600 | 16 | | 32 | | | | |
| | 选修课 Courses Elective | 4060360130 | 采矿工程专业外语<br>Specialized English of Mining Engineering | 2 | 32 | | | | | 5 | | |
| | | 4060009110 | 安全工程学<br>Safety Engineering | 2 | 32 | | | | | 5 | | |
| | | 4060075110 | 矿山采掘设备及其管理<br>Excavation Equipment and Management | 2 | 32 | | | | | 5 | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including | | | | | | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | | |
| | | 4050026110 | 弹性力学 B<br>Mechanics of Elasticity | 3 | 48 | | | | | 6 | 材料力学 C | |
| | | 4060094110 | 矿业系统工程<br>Mining Systems Engineering | 3 | 48 | | | | | 6 | 概率论与数理统计 A | |
| | | 4060119110 | 选矿工艺与实例<br>Technics and Examples of Mineral Processing | 2 | 32 | | | | | 7 | | |
| | | 4060069110 | 控制爆破<br>Demolition Blasting | 2 | 32 | | | | | 7 | 爆破工程 | |
| | | 4060013110 | 爆破安全技术<br>Security Techniques of Blasting | 2 | 32 | | | | | 7 | 爆破工程 | |
| | | 4060114110 | 危险辨识与风险评价技术<br>Hazard Identification & Risk Assessment | 2 | 32 | | | | | 7 | | |
| | | 4060223110 | 安全系统工程与系统管理<br>Safety System Engineering and System Management | 4 | 64 | | | 32 | | 7 | | |
| | | 4060079120 | 矿山企业管理<br>Mine Enterprise Management | 2 | 32 | | | | | 7 | | |
| | | 4060136110 | 总图与厂矿道路工程<br>Road Engineering | 2 | 32 | | | | | 7 | | |
| | | 4060105110 | 石材工程<br>Stone Material Project | 2 | 32 | | | | | 7 | | |
| | | 4060026110 | 地下空间工程<br>Underground Engineering | 2 | 32 | | | | | 7 | | |
| | | 小 计 Subtotal | | 32 | 512 | | | 32 | | | | |
| | | 修读说明：要求至少选修 16 学分。<br>NOTE：Minimum subtotal credits: 16. | | | | | | | | | | |
| 个性课程 Personalized Course | 选修课 Elective Courses | 4060328130 | 矿业工程前沿<br>Mining Engineering Frontier | 2 | 32 | | | | | 5 | | |
| | | 4060329130 | 对地观测技术与公共安全<br>earth Observation Technology and Public Safety | 2 | 32 | | | | | 4 | | |
| | | 4060330130 | 安全工程前沿<br>Safety Engineering Frontier | 2 | 32 | | | | | 5 | | |
| | | 4060361130 | 采矿工程数值模拟与仿真<br>Numerical Modeling and Simulation of Mining Engineering | 2 | 32 | | | | | 6 | | |
| | | 小 计 Subtotal | | 8 | 128 | | | | | | | |
| | | 修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 10 学分。<br>NOTE: Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 10. | | | | | | | | | | |

## 九、集中性实践教学环节建议进程表

## Ⅸ Practice Schedule

| 课程编号 Course Number | 实践环节名称 Practice Courses Name | 周数 Weeks | 学分 Crs | 建议修读学期 Suggested Term | 第二专业 Second Major |
|---|---|---|---|---|---|
| 1060002110 | 军事训练<br>Military Training | 3 | 1.5 | 1 | |

| 课程编号<br>Course Number | 实践环节名称<br>Practice Courses Name | 周数<br>Weeks | 学分<br>Crs | 建议修读学期<br>Suggested Term | 第二专业<br>Second Major |
|---|---|---|---|---|---|
| 4060314130 | 认识实习（含地质实习）<br>Field trip Ⅰ（including practice of geology） | 1 | 1 | 4（暑期） | |
| 4080151110 | 机械制造工程实训 C<br>Machinery Manufacturing Engineering Practice | 2 | 2 | 5 | |
| 4080146110 | 机械设计基础课程设计<br>Course Design on Foundation of Machine Design | 2 | 2 | 5 | |
| 4060264120 | 工程技术综合实验<br>Engineering Techniques Lab. Session | 2 | 2 | 6 | |
| 4060202110 | 生产实习<br>Field Trip | 2 | 2 | 6（暑期） | |
| 4060192110 | 能力拓展训练<br>Ability Development Training | 1 | 1 | 6（暑期） | |
| 4060163110 | 工矿通风与空调课程设计<br>Mine and Industry Ventilation & Air-Condition | 1 | 1 | 7 | |
| 4060284130 | 工程设计数字化训练<br>Engineering Design Digital Training | 1 | 1 | 7 | |
| 4060150110 | 毕业实习<br>Graduation Practice | 2 | 2 | 8 | |
| 4060258120 | 毕业设计（论文）<br>Graduation Thesis | 15 | 10 | 8 | |
| 小　　计　Subtotal | | 32 | 25.5 | | |

## 十、其它要求

## Ⅹ Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term . The course will be arranged by the University Students' Affairs' Department in each school.

# 安全工程专业本科培养方案
# Undergraduate Program for Specialty in Safety Engineering

## 一、业务培养目标

## Ⅰ Educational Objectives

本专业培养具备安全科学与工程学科的基本理论、知识和技能，能在矿山、建筑、冶金、交通、消防、能源、职业健康和保险等行业从事安全技术及工程、安全科学及研究、安全监察与管理、安全设计与生产、安全教育与培训等方面的工作，适应社会主义市场经济发展的高素质复合型工程技术与管理人才。

The major aims to train multi-skilled senior engineering and management personnel for the development of socialist market economy. The graduates are required to master the basic theory of safety science and engineering discipline, and have the ability to work in the field of safety technology and engineering, safety science and research, safety supervision and management, safety design and production, and safety education and training in the industries such as mining, construction, environment, transportation, fire protection and land management.

## 二、业务培养要求

## Ⅱ Educational Requirements

本专业学生主要学习安全工程学、灾害防治理论与技术、安全信息系统等方面的基本理论和基本知识，受到应用基础研究和技术开发方面的科学思维和科学实验训练，具有较好的科学素养；具备注册安全工程师基础知识、专业能力和素质，掌握安全工程设计、生产开发与应急技术的基本技能及初步的教学、研究、开发和管理能力。通过大学四年的学习，毕业生应获得以下几方面的知识和能力：

1. 具有较扎实的数学、物理、计算机科学等方面的自然科学基础，较好的人文社会科学基础和外语综合能力；

2. 具有运用安全工程学、安全心理学、人机工程学、安全信息学、安全经济学、灾害防治理论与技术、职业安全与卫生学等知识进行灾害应急预警、安全管理和安全评价能力；

3. 掌握基本的工程地质学、安全检测与监测、矿山通风与安全等工程知识，能结合矿床开采工艺环节，对矿山事故、地质与工程灾害等开展调查和分析，改进矿山生产工艺或管理模式；

4. 掌握火灾与爆炸灾害基础知识，并能运用所学的电工学、计算机技术和防火防爆等专业知识，对生产过程进行安全检测、监测与控制；

5. 掌握安全信息系统、工程安全与事故应急技术和安全管理学等基础知识，熟练运用以地理空间信息技术为核心的专业化软件，具备设计、开发和应用安全与环境监测系统专业技能和工程管理理念；

6. 了解交通运输工程、土木工程、环境工程和地理信息科学等相关专业中运用安全科学的一般原理、技术和方法；掌握与安全职业和行业相关的国家有关科学技术、安全生产、环境保护和劳动保护等方面的政策和法规，紧跟国际安全科学与工程的理论前沿、应用前景和最新发展动态，以及安全工程领域相关产业发展状况；

7. 掌握资料查询、文献检索及运用现代信息技术获取相关信息的基本方法；具有一定的实验设计、创造实验条件，归纳、整理、分析实验结果，撰写论文、参与学术交流的能力。

The curriculum of the major includes safety engineering, disaster prevention theory and technology, safety information system, etc. The undergraduates are required to study the basic theory and knowledge of these courses. The students will be trained with the scientific thought and experiment in aspects of both applied fundamental research and technology development. Then the students will have good scientific literacy, and have the ability to conduct safety design, production & development, and emergency technology. The students should also have the preliminary abilities of teaching, research, development and managements. The graduates

should have the required knowledge, skills and abilities as follows after four-year college education:

1 Solid foundation in mathematics, physics, computer science, etc; qualified foundation in humanities and social sciences and comprehensive foreign language abilities.

2 Abilities to conduct disaster emergency warning, safety management and evaluation using the knowledge of safety engineering, safety psychology, ergonomics, safety informatics, safety economics, disaster prevention theory and technology, occupational safety and health, etc. 3 Master the engineering knowledge of engineering geology, safety detection and monitoring, mine ventilation and safety, etc.; abilities to improve the production process or management mode in mines based on the survey and analysis of mine accidents, geological and engineering disasters with the consideration of the technique process of mines.

4 Master the fundamentals of fire and explosion hazards; have the abilities to perform safety detection, monitoring and control in the production process on the basis of the professional knowledge of the electro-technology, computer technology and fire and explosion prevention, etc.

5 Master the basic knowledge of safety information system, engineering safety and accident emergency response techniques, safety management; Proficient in the commercial codes & software based on geospatial information technology; have the professional skills and engineering management ideas in the design, development and application of safety & environment monitoring systems.

6 Have the knowledge about the application of the general principles, techniques and methods of safety science in traffic transportation engineering, construction engineering, environment engineering and geographic information science; master the national policies, laws and regulations related to the safety occupation and industry in the science & technology, production safety, environment protection; Keep up with the international theory forefront of safety science and engineering, application prospects, the latest status and the development situation in industries concerned with safety engineering.

7 Master the basic methods of data query, the literature search and the application of modern information technology in acquiring information; Have the abilities to design experiment, create experimental conditions, and induce, process and analyze the experimental data. Have the abilities to write paper and participate in academic exchanges.

## 三、主干学科

## Ⅲ Major Disciplines

主干学科：安全科学与工程

Main subjects: Safety Science and Engineering

## 四、专业核心课程与专业特色课程

## Ⅳ Core Courses and Characteristic Courses

专业核心课程：安全工程学、安全人机工程、安全系统工程、危险源辨识与风险评价、职业安全与卫生、燃烧与爆炸学

专业基础课程：工程力学、地质学、流体力学、工程热力学与传热学、可靠性分析、安全监测与检测、灾害防治理论与技术、安全经济学

专业特色课程：安全信息系统、工矿通风与空调、防火防爆工程、建筑工程施工安全、地质灾害预报与防治、矿床开采概论、矿山安全评价、爆破安全技术、公共安全与应急技术

Core courses: Safety Engineering, Safety Ergonomics, Safety Systems Engineering, Safety Management, Hazard Identification & Risk Assessment, Occupational Safety and Health, Combustion and Explosion Science

Basic courses: Engineering Mechanics, Safety Psychology, Physical Geology, Fluid Mechanics, Engineering Thermodynamics and Heat Transfer, Reliability Analysis, Safety Economics

Specialty courses: Safety Information System, Mine Ventilation and Air Conditioning, Safety Detection and Monitoring Technology, Prediction and Prevention of Geological Disasters, Construction Engineering Safety, Mining Safety, Transportation System Safety Technology, Blasting Safety, Public Security and Emergency Technology, etc.

## 五、计划学制与学位

## Ⅴ Length of School and Degree

修业年限：四年

Duration： Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineering

## 六、最低毕业学分规定

## Ⅵ Graduation Credit Criteria

| 课程类别 Course Classification / 课程性质 Course Nature | 通识课程 Public Basic Courses | 学科大类课程 Basic Courses in General Discipline | 专业课程 Courses in Specialty | 个性课程 Personalized Course | 集中性实践 Practice Courses | 课外学 Extracurricular Credits | 总学分 Total Credits |
|---|---|---|---|---|---|---|---|
| 必修课 Required Courses | 35 | 41 | 34 | \ | 29 | \ | 190 |
| 选修课 Elective Courses | 9 | 6 | 16 | 10 | \ | 10 | |

## 七、课程修读指导建议

## Ⅶ Recommendations on Course Studies

## 八、理论教学建议进程表

## Ⅷ Theory Course Schedule

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课程名称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 通识课程 Public Basic Courses | 必修课 Required Courses | 4220001110 | 思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law | 3 | 48 | | | 8 | | 1-6 | | |
| | | 4220002110 | 中国近现代史纲要 Outline of Contemporary and Modern Chinese History | 2 | 32 | | | | | 1-6 | | |
| | | 4220003110 | 毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics | 4 | 96 | | | 32 | | 1-6 | | |
| | | 4220005110 | 马克思主义基本原理 Marxism Philosophy | 3 | 48 | | | 8 | | 1-6 | | |
| | | 1060003130 | 军事理论 Military Theory | 1 | 32 | | | 16 | | 1-4 | | |
| | | 4210001110 | 体育 1 Physical Education Ⅰ | 1 | 32 | | | | | 1 | | |
| | | 4210002110 | 体育 2 Physical Education Ⅱ | 1 | 32 | | | | | 2 | 体育 1 | |
| | | 4210003110 | 体育 3 Physical Education Ⅲ | 1 | 32 | | | | | 3 | 体育 2 | |
| | | 4210004110 | 体育 4 Physical Education Ⅳ | 1 | 32 | | | | | 4 | 体育 3 | |
| | | 1050001130 | 心理健康教育 Mental Health Education | 1 | 16 | | | | | 1-2 | | |
| | | 4030002110 | 大学英语 A1 College English A 1 | 3 | 64 | | | | 16 | 1 | | |
| | | 4030003110 | 大学英语 A2 College English A Ⅱ | 3 | 64 | | | | 16 | 2 | 大学英语 A1 | |
| | | 4030004110 | 大学英语 A3 College English A Ⅲ | 3 | 64 | | | | 16 | 3 | 大学英语 A2 | |
| | | 4030005110 | 大学英语 A4 College English A Ⅳ | 3 | 64 | | | | 16 | 4 | 大学英语 A3 | |
| | | 4120017110 | 大学计算机基础 Foundation of Computer | 2 | 32 | | 12 | | | 1 | | |
| | | 程序设计语言课程组(三选一，3 学分) Courses of Computer Program Design (select one out of three, Credits: 3) | | | | | | | | | | |
| | | 4120023110 | 计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C) | 3 | 48 | | 12 | | | 2 | | |
| | | 4120024110 | 计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN) | 3 | 48 | | 12 | | | 2 | | |
| | | 4120025110 | 计算机程序设计基础(VB 语言) Fundamentals of Computer Program | 3 | 48 | | 12 | | | 2 | | |
| | | 小 计 Subtotal | | 35 | 736 | | 24 | 64 | 64 | | | |
| | 选修课 Elective Courses | 创新创业类 Innovation and Entrepreneurship Courses | | 全校学生要求至少取得 9 学分，建议在每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively. | | | | | | | | |
| | | 人文社科类 Arts and Social Science Courses | | | | | | | | | | |
| | | 经济管理类 Economy and Management Courses | | | | | | | | | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 科学技术类 Science and Technology Courses | | | | | | | | | | |
| | | 艺术体育类 Art and Physical Education Courses | | | | | | | | | | |
| 学科大类课程 Basic Disciplinary Courses | 必修课 Required Courses | 4060212110 | 专业导论 Introduction to Specialty | 1 | 16 | | | | | 1 | | |
| | | 4050229110 | 线性代数 Linear Algebra | 2.5 | 40 | | | | | 1 | | |
| | | 4050063110 | 高等数学 A 上 Advanced Mathematics A | 5 | 80 | | | | | 1 | | |
| | | 4050064110 | 高等数学 A 下 Advanced Mathematics A | 5 | 80 | | | | | 2 | 高等数学 A 上 | |
| | | 4060027110 | 地质学 Physical Geology | 2.5 | 40 | | | | | 2 | | |
| | | 4080041110 | 工程图学 B Engineering Graphics B | 4 | 64 | | 4 | | | 2 | 线性代数 | |
| | | 4050057110 | 概率论与数理统计 A Probability and Mathematics A | 4.5 | 72 | | | | | 3 | | |
| | | 4050463130 | 大学物理 B Physics B | 5 | 80 | | | | | 3 | | |
| | | 4050224110 | 物理实验 B Physics Lab. B | 1 | 32 | 32 | | | | 4 | 大学物理 B | |
| | | 4050012110 | 电工与电子技术基础 C Fundamentals of Electrical Engineering & Electric C | 4 | 64 | 10 | | | | 4 | | |
| | | 4050220110 | 物理化学 C Physical Chemistry C | 3 | 48 | | | | | 4 | | |
| | | 测量课程组（二选一，3.5 学分） Surveying courses (Choice one freely,Crs:3.5) | | | | | | | | | | |
| | | 4060241120 | 矿山测量 Mining Geodesy | 3.5 | 56 | | 10 | 16 | | 3 | | |
| | | 4060272120 | GPS 原理及测量应用 GPS Principle and Its Application in | 3.5 | 56 | | 10 | 16 | | 3 | | |
| | | 小 计 Subtotal | | 41 | 672 | 42 | 14 | 16 | | | | |
| | 选修课 Elective Courses | 4060128110 | 资源工程 CAD Resource Engineering CAD | 2 | 32 | | 24 | | | 2 | | |
| | | 4060118110 | 虚拟现实技术 Virtual Reality | 2 | 32 | 12 | | | | 3 | | |
| | | 4060124110 | 灾害防治理论与技术 Calamity Prevention theory and technology | 2 | 32 | | | | | 3 | | |
| | | 4060091110 | 矿业工程项目管理 Engineering project management | 2 | 32 | | | | | 3 | | |
| | | 4060125110 | 灾害学原理 Disaster Science | 2 | 32 | | | | | 3 | | |
| | | 4060301130 | 矿业技术经济学 Mining Economics | 2 | 32 | | | | | 4 | | |
| | | 4060129110 | 安全管理学 Safety Management | 2 | 32 | | | | | 4 | | |
| | | 4060324130 | 安全心理学 Safety Psychology | 2 | 32 | | | 8 | | 4 | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4060100110 | 人工智能与专家系统<br>AI & ES | 2 | 32 | | | | | 4 | | |
| | | 小 计 Subtotal | | 18 | 288 | 12 | 24 | 8 | | | | |
| | | 修读说明：要求至少选修 6 学分。<br>NOTE：Minimum subtotal credits: 6. | | | | | | | | | | |
| 专业课程 Specialized Courses | 必修课 Required Courses | 4080061110 | 机械设计基础<br>Foundation of Machine Design | 3.5 | 56 | 6 | | | | 5 | | |
| | | 4050130110 | 工程力学 A<br>Engineering Mechanics B | 4 | 64 | | | | | 5 | | |
| | | 4050014110 | 工程热力学与传热学 C<br>Engineering Thermodynamics and Heat Transfer C | 3 | 48 | 8 | | | | 5 | 工程力学 A | |
| | | 4050136110 | 流体力学 D<br>Fluid Mechanics D | 2 | 32 | 6 | | | | 5 | 工程力学 A | |
| | | 4060325130 | 系统可靠性分析<br>System Reliability analysis | 2 | 32 | | | | | 5 | | |
| | | 4060240120 | 安全检测与监测<br>Safety Detection and Monitoring | 2.5 | 40 | | | 8 | | 6 | | |
| | | 4060326130 | 燃烧与爆炸学<br>Combustion and Explosion | 2.5 | 40 | 8 | | | | 6 | | |
| | | 4060327130 | 安全信息系统<br>Safety Information System | 3 | 48 | | | 16 | | 6 | | |
| | | 4060009110 | 安全工程学<br>Safety Engineering | 2.5 | 40 | | | | | 6 | | |
| | | 4060011110 | 安全人机工程<br>Safety Man-Machine Engineering | 2 | 32 | 8 | | | | 5 | | |
| | | 4060114110 | 危险辨识与风险评价<br>Hazard Identification & Risk Assessment | 2 | 32 | | | | | 7 | | |
| | | 4060126110 | 职业安全卫生<br>Occupational Safety and Health | 2 | 32 | | | | | 7 | | |
| | | 4060363130 | 安全系统工程与管理<br>Safety System Engineering & Management | 3 | 48 | | | 16 | | 7 | | |
| | | 小 计 Subtotal | | 34 | 544 | 36 | | 40 | | | | |
| | 选修课 Elective Courses | 4060328130 | 安全工程专业外语<br>Specialized English of Safety Engineering | 2 | 32 | | | | | 5 | | |
| | | 4060362130 | 地质灾害预报与防治<br>Geological Disaster Prediction | 2 | 32 | | | | | 5 | | |
| | | 4200317130 | 化工安全<br>Chemical engineering safety | 2 | 32 | | | | | 5 | | |
| | | 4060329130 | 矿床开采概论<br>Mining Exploitation | 3 | 48 | | | | | 6 | | |
| | | 4060094110 | 矿业系统工程<br>Mining Systems Engineering | 3 | 48 | | | | | 6 | | |
| | | 4060014110 | 爆破工程<br>Blasting Engineering | 2 | 32 | | | | | 6 | | |
| | | 4060029110 | 防火防爆工程<br>Fire Prevention and Protection | 2 | 32 | | | | | 7 | | |
| | | 4060330130 | 安全经济学<br>Safety Economics | 2 | 32 | | | | | 6 | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4060230120 | 工矿通风与空调<br>Mine and Industry Ventilation & Air-Conditioning | 2.5 | 40 | | | 16 | | 7 | | |
| | | 4060074110 | 矿山安全评价<br>Mine Safety Assessment | 2 | 32 | | | | | 7 | | |
| | | 4060061110 | 建设工程施工安全<br>Construction Safety | 2 | 32 | | | | | 7 | | |
| | | 4060013110 | 爆破安全技术<br>Blasting Safety Technology | 2 | 32 | | | | | 7 | | |
| | | 4060026110 | 地下空间工程<br>Underground Engineering | 2 | 32 | | | | | 7 | | |
| | | 4060062110 | 交通运输安全技术<br>Transportation Safety | 2 | 32 | | | | | 7 | | |
| | | 4060331130 | 公共安全与应急技术<br>Public Security and Emergency Technology | 2 | 32 | | | | | 7 | | |
| | | 4060123110 | 预测学<br>Prediction Theory | 2 | 32 | | | | | 7 | | |
| | | 4060008110 | 安全法规<br>Safety Law | 2 | 32 | | | | | 7 | | |
| | | 4060010110 | 安全教育与培训<br>Safety Education Skills | 2 | 32 | | | | | 7 | | |
| | | | | | | | | | | | | |
| | | 小 计 Subtotal | | 38.5 | 616 | | | 16 | | | | |
| | | 修读说明：要求至少选修 16 学分。<br>NOTE：Minimum subtotal credits: 16. | | | | | | | | | | |
| 个性课程 Personalized Course | 选修课 Elective Courses | 4060329130 | 对地观测技术与公共安全<br>earth Observation Technology and Public Safety | 2 | 32 | | | | | 5 | | |
| | | 4060330130 | 安全工程前沿<br>Safety Engineering Frontier | 2 | 32 | | | | | 5 | | |
| | | 4060331130 | 安全仿真与模拟<br>Safety Simulation and Modeling | 2 | 32 | | | | | 7 | | |
| | | 4060332130 | 公共安全与应急技术<br>Public Safety and Emergency Response Technology | 2 | 32 | | | | | 7 | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | 小 计 Subtotal | | 10 | 160 | | | | | | | |
| | | 修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 10 学分。<br>NOTE：Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 10. | | | | | | | | | | |

## 九、集中性实践教学环节建议进程表

## Ⅸ Practice Schedule

| 课程编号<br>Course Number | 实践环节名称<br>Practice Courses Name | 周数<br>Weeks | 学分<br>Crs | 建议修读学期<br>Suggested Term | 第二专业<br>Second Major |
|---|---|---|---|---|---|
| 1060002110 | 军事训练<br>Military Training | 3 | 1.5 | 1 | |
| 4060332130 | 认识实习（含地质实习）<br>Field trip Ⅰ（including practice of geology） | 1.5 | 1.5 | 4(暑期) | |
| 4060333130 | 基础强化训练<br>Foundation Strengthening Training | 1 | 1 | 4(暑期) | |
| 4100069110 | 电工电子实习 B<br>Electrics Practice B | 1 | 1 | 4 | |
| 4080151110 | 机械制造工程实训 C<br>Machinery Manufacturing Engineering Practice C | 2 | 2 | 5 | |
| 4080146110 | 机械设计基础课程设计<br>Course Design on Foundation of Machine Design | 2 | 2 | 5 | |
| 4060271120 | 专业综合实验<br>General Experimentation for Safety Engineering | 3 | 3 | 6 | |
| 4060334130 | 生产实习<br>Field Trip | 2 | 2 | 6 | |
| 4060336130 | 能力拓展训练<br>Ability Development Training | 1 | 1 | 6(暑期) | |
| 4060335130 | 安全工程数字化训练<br>Digital Training of Safety Engineering | 2 | 2 | 7 | |
| 4060337130 | 毕业实习<br>Graduation Practice | 2 | 2 | 8 | |
| 4060144110 | 毕业设计（论文）<br>Graduation Thesis | 15 | 10 | 8 | |
| 小　　计　Subtotal | | 35.5 | 29 | | |

## 十、其它要求

## Ⅹ Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term. The course will be arranged by the University Students' Affairs' Department in each school.

# 矿物加工工程专业本科培养方案
# Undergraduate Educational Program of Specialty in Mineral Processing Engineering Specialty

## 一、业务培养目标

### Ⅰ Educational Objectives

本专业培养具备矿物（非金属、金属）分选加工、矿物材料制备、矿产资源综合利用相关的基础知识和基本技能，具有人文社会科学素养、社会责任感和工程职业道德，具备工程实践（设计、工程实验）能力，了解专业发展前沿方向，具有创新意识和国际视野与对外交流能力，能在矿物加工工程与矿物材料等相关领域从事建设规划、工程设计、生产与经营管理、研究开发等方面工作的工程技术人才，经过五年左右发展成为矿业工程师。

This Specialty aims at training engineering and technological personnel with basic knowledge in the fields of mineral (metallic and nonmetallic) separation and processing, mineral material preparation, comprehensive utilization of mineral resources.Those undergraduates also should own social science attainments,social responsibility and engineering profession morality,being able to undertake enginneering practise(including design and engineering experiments),knowing major developing forwards,posessing creative minds,international view and international communication ability. After about 5 years they will develop into qualified mineral engineers and can undertake the work in the area of building planning, design of process and equipment, management and administration, research and development in the institutions of planning and design.

## 二、业务培养要求

### Ⅱ Educational Requirement

本专业学生主要学习化学、外语、矿石与矿物、矿物加工工艺、矿物材料制备与应用及资源综合利用等方面的基本理论和基础知识，受到实验研究、工程设计方法、计算机应用及外语应用等方面的基本训练，具有矿物加工、矿物材料与矿产资源综合利用等研究和工程设计的基本能力。

毕业生应获得以下几个方面的知识能力：

1．掌握有关数学、化学、物理学等基本理论、基本知识；

2．掌握本专业所必需的矿物学与矿石学、机械设计、电工与电子技术、计算机应用的基本知识的技能；

3．掌握矿物（金属、非金属）材料科学的基本知识及材料性能检测、研究方法及产品质量控制的基本知识和技能；

4．掌握矿物加工企业管理、环境治理、选矿过程模拟与自动化等的基本知识

5．掌握矿物加工厂工艺工程设计的方法，并具有进行工艺设计的能力；

6．熟悉国家关于矿产资源开发、加工与利用方面的相关产业政策、国内外知识产权方面的法律法规；

7．掌握资料查询，文献检索以及运用现代信息技术获取相关信息的基本方法；具有一定的创新意识和进行科学研究的能力。

8．掌握一门外语，具有较好的语言应用能力，能阅读外文文献，进行基本的口语交流。

Students of this specialty mainly study the basic theories and fundamental knowledge in the fields of chemistry, foreign languages, ores and minerals, mineral processing technology, preparation and application of mineral materials, and comprehensive utilization of resources. The students are provided with basic training in the aspects of experimental research, engineering design methods, computer application and foreign

language application. The students will possess basic ability of research and engineering design in the fields of mineral processing,and mineral materials .

The graduates should obtain the following knowledge and ability:

1. To master the fundamental theories and basic knowledge concerning mathematics,chemistry and physics.
2. To master the basic knowledge and ability necessary for this specialty, including mineralogy and lithology, mechanics, electrical and electronic technology, and application of computers.
3. To master the basic knowledge of mineral (metallic and nonmetallic) material science and the basic knowledge and ability of material characteristic testing, research methods and product quality control.
4. To master the basic knowledge of mineral processing corporation management,environment administration,mineral processing simulation and automation,et al.
5. To master the methods of engineering design of mineral processing plant and possess the ability of performing technological design.
6. To be familiar with the relevant nation industrial policies about the development, processing and utilization of mineral resources, domestic and foreign laws and regulations with respect to intellectual properties.
7. To master the basic methods of searching data, retrieving literatures and obtaining relevant information by using modern information technology, and to be trained with certain innovative consciousness and ability to conduct scientific research.
8. To master at least one foreign language, with excellent language application ability, being able to read literatures in foreign language and perform basic oral communication.

## 三、主干学科

## Ⅲ Major Disciplines

主干学科：矿业工程

**Major Disciplines: Mine Engineering**

## 四、专业核心课程与专业特色课程

## Ⅳ Core Courses and Characteristic Courses

专业核心课程：矿石学、无机化学、物理化学、矿物加工工艺学、化学选矿、矿物材料工艺学、矿物加工试验研究方法、矿物加工厂工艺设计等。

Core Courses: Lithology, inorganic chemistry, physical chemistry, mineral processing technology, chemical mineral processing, mineral material technology, mineral processing experimental research methods, mineral processing plant process design.

专业特色课程：矿石学、矿物加工工艺学、矿物材料工艺学、化学选矿

Characteristic Courses: Lithology, mineral processing technology, mineral material technology, chemical mineral processing.

## 五、计划学制与学位

## Ⅴ Length of School and Degree

修业年限：四年

Duration： Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineer

## 六、最低毕业学分规定

## Ⅵ Graduation Credit Criteria

| 课程类别 Course Classification / 课程性质 Course Nature | 通识课程 Public Basic Courses | 学科大类课程 Basic Courses in General Discipline | 专业课程 Courses in Specialty | 个性课程 Personalized Course | 集中性实践 Practice Courses | 课外学 Extracurricular Credits | 总学分 Total Credits |
|---|---|---|---|---|---|---|---|
| 必修课 Required Courses | 35 | 56 | 25.5 | \ | 31 | \ | 190 |
| 选修课 Elective Courses | 9 | 5.5 | 8 | 10 | \ | 10 | |

## 七、课程修读指导建议

## Ⅶ Recommendations on Course Studies

## 八、理论教学建议进程表

## Ⅷ Theory Course Schedule

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课程名称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extracur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 通识课程 Public Basic Courses | 必修课 Required Courses | 4220001110 | 思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law | 3 | 48 | | | 8 | | 1-6 | | |
| | | 4220002110 | 中国近现代史纲要 Outline of Contemporary and Modern Chinese History | 2 | 32 | | | | | 1-6 | | |
| | | 4220003110 | 毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics | 4 | 96 | | | 32 | | 1-6 | | |
| | | 4220005110 | 马克思主义基本原理 Marxism Philosophy | 3 | 48 | | | 8 | | 1-6 | | |
| | | 1050001130 | 心理健康教育 Mental health education | 1 | 16 | | | | | 1-2 | | |
| | | 1060003130 | 军事理论 Military Theory | 1 | 32 | | | 16 | | 2-4 | | |
| | | 4210001110 | 体育 1 Physical Education Ⅰ | 1 | 32 | | | | | 1 | | |
| | | 4210002110 | 体育 2 Physical Education Ⅱ | 1 | 32 | | | | | 2 | 体育 1 | |
| | | 4210003110 | 体育 3 Physical Education Ⅲ | 1 | 32 | | | | | 3 | 体育 2 | |
| | | 4210004110 | 体育 4 Physical Education Ⅳ | 1 | 32 | | | | | 4 | 体育 3 | |
| | | 4030002110 | 大学英语 A1 College English AⅠ | 3 | 64 | | | | 16 | 1 | | |
| | | 4030003110 | 大学英语 A2 College English A Ⅱ | 3 | 64 | | | | 16 | 2 | 大学英语 A1 | |
| | | 4030004110 | 大学英语 A3 College English A Ⅲ | 3 | 64 | | | | 16 | 3 | 大学英语 A2 | |
| | | 4030005110 | 大学英语 A4 College English A Ⅳ | 3 | 64 | | | | 16 | 4 | 大学英语 A3 | |
| | | 4120017110 | 大学计算机基础 Foundation of Computer | 2 | 32 | | 12 | | | 1 | | |

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extracur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 程序设计语言课程组(三选一，3 学分) Computer Program DesignC Language Courses(Choice One freely) | | | | | | | | | | |
| | | 4120023110 | 计算机程序设计基础(C 语言) Fundamentals of Computer Program DesignC Language) | 3 | 48 | | 12 | | | 2 | | |
| | | 4120024110 | 计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN Language) | 3 | 48 | | 12 | | | 2 | | |
| | | 4120025110 | 计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB Language) | 3 | 48 | | 12 | | | 2 | | |
| | | 小 计 Subtotal | | 35 | 736 | | 24 | 64 | 64 | | | |
| | 选修课 Elective Courses | 创新创业类 Innovation and Entrepreneurship Courses | 全校学生要求至少取得 9 学分，建议在每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively. | | | | | | | | | |
| | | 人文社科类 Arts and Social Science Courses | | | | | | | | | | |
| | | 经济管理类 Economy and Management Courses | | | | | | | | | | |
| | | 科学技术类 Science and Technology Courses | | | | | | | | | | |
| | | 艺术体育类 Art and Physical Education Courses | | | | | | | | | | |
| 学科大类课程 Basic Disciplinary Courses | 必修课 Required Courses | 4060214110 | 专业导论 Introduction to Materials Physics | 1 | 16 | | | | | 1 | | |
| | | 4050063110 | 高等数学 A 上 Advanced Mathematics AⅠ | 5 | 80 | | | | | 1 | | |
| | | 4050064110 | 高等数学 A 下 Advanced Mathematics AⅡ | 5 | 80 | | | | | 2 | 高等数学 A 上 | |
| | | 4050207110 | 无机化学 B 上 Chemistry BⅠ | 3 | 48 | | | | | 1 | | |
| | | 4050208110 | 无机化学 B 下 Chemistry BⅡ | 1.5 | 24 | | | | | 2 | 无机化学 B 上 | |
| | | 4050209110 | 无机化学 B 实验上 Inorganic Chemistry B ExperimentⅠ | 1 | 24 | 24 | | | | 1 | | |
| | | 4050210110 | 无机化学 B 实验下 Inorganic Chemistry B ExperimentⅡ | 0.5 | 24 | 24 | | | | 2 | 无机化学 B 实验上 | |
| | | 4080042110 | 工程图学 C Engineering Drawing C | 4 | 64 | | 8 | | | 2 | | |
| | | 4050021110 | 大学物理 A 上 Physics AⅠ | 3.5 | 56 | | | | | 2 | | |
| | | 4050022110 | 大学物理 A 下 Physics AⅡ | 3.5 | 56 | | | | | 3 | 大学物理 A 上 | |
| | | 4050222110 | 物理实验 A 上 Physics Lab. AⅠ | 1 | 28 | 28 | | | | 3 | | |
| | | 4050223110 | 物理实验 A 下 Physics Lab. AⅡ | 1 | 28 | 28 | | | | 4 | 物理实验 A 上 | |
| | | 4050229110 | 线性代数 Linear Algebra | 2.5 | 40 | | | | | 2 | | |
| | | 4050071110 | 工程力学 A Engineering Mechanics A | 4 | 64 | 4 | | | | 3 | | |
| | | 4050220110 | 物理化学 C Physical Chemistry C | 4 | 64 | | | | | 3 | | |

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课程名称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extracur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4050221110 | 物理化学 C 实验<br>Physical Chemistry C Experimental | 0.5 | 16 | 16 | | | | 3 | | |
| | | 4050058110 | 概率论与数理统计 B<br>Probability and Mathematics B | 3 | 48 | | | | | 4 | | |
| | | 4060128110 | 资源工程 CAD<br>Resource Engineering CAD | 2 | 32 | 24 | | | | 5 | | |
| | | 4060015110 | 表面与胶体化学<br>Surface and Colloid Chemistry | 2.5 | 40 | | | | | 4 | 大学物理 A 下 | |
| | | 4100012110 | 电工与电子技术基础 C<br>Fundamentals of Electrical and Electronic Technology C | 4 | 64 | 4 | 10 | | | 4 | 大学物理 A 下 | |
| | | 4080061110 | 机械设计基础<br>Mechanical Design Basis | 3.5 | 56 | 6 | | | | 5 | | |
| | | 小 计 Subtotal | | 56 | 952 | 164 | 8 | | | | | |
| | 选修课 Elective Courses | 4050251110 | 有机化学 C<br>Organic Chemistry | 3 | 48 | | | | | 2 | | |
| | | 4060052110 | 环境矿物材料<br>Environmental Mineral Materials | 2 | 32 | | | | | 3 | | |
| | | 4060129110 | 资源环境经济学<br>Resource and Environment Economics | 2 | 32 | | | | | 3 | | |
| | | 4050134110 | 流体力学 C<br>Fluid Mechanics C | 3 | 48 | 6 | | | | 4 | | |
| | | 4060027110 | 地质学<br>Physical Geology | 2.5 | 40 | | | | | 4 | | |
| | | 小 计 Subtotal | | 12.5 | 200 | 6 | | | | | | |
| | | 修读说明：要求至少选修 5.5 学分。<br>NOTE：Minimum subtotal credits: 5.5. | | | | | | | | | | |
| 专业课程 Specialized Courses | 必修课 Required Courses | 4200014110 | 化工基础<br>Elementary Chemical Industry | 3 | 48 | 8 | | | | 4 | | |
| | | 4060243120 | 矿石学<br>Lithology | 3 | 48 | 16 | | | | 4 | | |
| | | 4060229120 | 粉碎工程<br>Comminution Engineering | 3 | 48 | | | 16 | | 5 | | |
| | | 4060246120 | 矿物加工工艺学<br>Mineral Processing Technology | 5 | 80 | | | | | 5 | | |
| | | 4060088110 | 矿物加工试验研究方法<br>Experimental Research Methods of Mineral Processing | 2 | 32 | | | | | 6 | | |
| | | 4060085110 | 矿物加工测试技术<br>Mineral Material Testing Techniques | 2 | 32 | | | | | 6 | 矿石学 | |
| | | 4060232120 | 化学选矿<br>Chemical Mineral Processing | 2 | 32 | | | | | 7 | 矿石学<br>无机化学 B 上 | |
| | | 4060244120 | 矿物加工厂工艺设计<br>Process Design of Mineral Processing Plant | 3 | 48 | | | 16 | | 7 | | |
| | | 4060083110 | 矿物材料工艺学<br>Mineral Material Technology | 2.5 | 40 | | | | | 6 | | |
| | | 小 计 Subtotal | | 25.5 | 408 | 24 | | 32 | | | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 课程编号 Course Number | 课 程 名 称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 选修课 Elective Courses | 4060276130 | 环境工程概论<br>Environment Engineering Introduction | 2 | 32 | | | | | 3 | | |
| | | 4060028110 | 二次资源开发利用<br>Exploitation and Utilization of Secondary | 2 | 32 | | | | | 5 | | |
| | | 4060084110 | 矿物粉体工程<br>Mineral Powder Technology | 2 | 32 | | | | | 5 | | |
| | | 4060089110 | 矿物生物技术<br>Biotechnology of Minerals | 2 | 32 | | | | | 6 | | |
| | | 4060036110 | 固液分离技术<br>Solid-liquid Separation Techniques | 2 | 32 | | | | | 6 | | |
| | | 4060312130 | 选矿过程模拟与自动化<br>Mineral Processing Simulation and Automation | 2 | 32 | | | | | 6 | | |
| | | 4060079110 | 矿山企业管理<br>Mine Corporation Management | 2 | 32 | | | | | 6 | | |
| | | 4060119110 | 选矿工艺与实例<br>Technics and Examples of Mineral | 2 | 32 | | | | | 7 | | |
| | | 4060031110 | 非金属矿物新型建筑材料<br>New Nonmetallic Mineral Building | 2 | 32 | | | | | 6 | | |
| | | 4060120110 | 选矿药剂<br>Mineral Processing Reagents | 2 | 32 | | | | | 7 | | |
| | | 4060093110 | 矿业技术经济学<br>Economics of Mining Technology | 2 | 32 | | | | | 6 | | |
| | | 小 计 Subtotal | | 22 | 352 | | | | | | | |
| | | 修读说明：要求至少选修 8 学分<br>NOTE: Minimum subtotal credits:8. | | | | | | | | | | |
| 个性课程 Personalized Course | 选修课 Elective Courses | 4060096110 | 摩擦与密封材料<br>Frictional and Sealing Material | 2 | 32 | | | | | 7 | | |
| | | 4060102110 | 烧结球团工艺学<br>Sintering Pelletizing Process | 2 | 32 | | | | | 6 | | |
| | | 4060217110 | 采矿概论<br>Mining Introduction | 2 | 32 | | | | | 5 | | |
| | | 4060136110 | 总图与厂矿道路工程<br>Assembly Drawing and Road Engineering | 2 | 32 | | | | | 7 | | |
| | | 4060333130 | 宝玉石加工导论<br>Itroduction of Gem Processing | 2 | 32 | | | | | 5 | | |
| | | 4060334130 | 矿物加工工程专业英语<br>Specialty English | 2 | 32 | | | | | 6 | | |
| | | 4060335130 | 矿物加工技术前沿<br>Advanced Mineral Processing Technology | 2 | 32 | | | | | 4 | | |
| | | 4060336130 | 矿业工程文献检索与信息技术导论<br>Mining Engineering Literature and Introduction to Information Technology | 2 | 32 | | | | | 6 | | |
| | | 4060337130 | 采矿工程<br>Mining Engineering | 2 | 32 | | | | | 5 | | |
| | | 4060338130 | 矿物加工厂自动化<br>Automation of Mineral Processing Plant | 2 | 32 | | | | | 6 | | |
| | | 小 计 Subtotal | | 20 | 320 | | | | | | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 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 | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | | | |
| | | 修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 10 学分。<br>NOTE：Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 10. | | | | | | | | | | |

## 九、集中性实践教学环节建议进程表

## Ⅸ Practice Schedule

| 课程编号 Course Number | 实践环节名称 Practice Courses Name | 周数 Weeks | 学分 Crs | 建议修读学期 Suggested Term | 第二专业 Second Major |
|---|---|---|---|---|---|
| 1060002110 | 军事训练<br>Military Training | 3 | 1.5 | 1 | |
| 4060199110 | 认识实习<br>Cognition Practice | 1 | 1 | 2（暑期） | |
| 4100069110 | 电工电子实习 B<br>Electric Practice | 1 | 1 | 4 | |
| 4080151110 | 机械制造工程实训 C<br>Machinery Manufacturing Engineering Practice C | 2 | 2 | 4 | |
| 4080146110 | 机械设计基础课程设计<br>Course Design on Foundation of Machine Design | 2 | 2 | 5 | |
| 4060269120 | 矿物系统鉴定实验<br>Mineral Identify | 2 | 2 | 5 | |
| 4060267120 | 矿物加工工艺学系统实验 1<br>Systematic Experiments of Mineral Processing Technology Ⅰ | 1.5 | 1.5 | 6 | |
| 4060268120 | 矿物加工工艺学系统实验 2<br>Systematic Experiments of Mineral Processing Technology Ⅱ | 2 | 2 | 7 | |
| 4060184110 | 矿石可选性综合实验<br>Serial Experiments of Ore Beneficiation Feasibility | 1.5 | 1.5 | 7 | |
| 4060186110 | 矿物材料工艺学系统实验<br>Systematic Experiments of Mineral material Technology | 1.5 | 1.5 | 7 | |
| 4060207110 | 专业实习（生产实习）<br>Professional (Production) Practice | 3 | 3 | 6 | |
| 4060152110 | 毕业实习<br>Graduation Practice | 2 | 2 | 8 | |
| 4060261120 | 毕业设计（论文）<br>Graduation Design (Dissertation) | 15 | 10 | 8 | |
| 小 计 Subtotal | | 37.5 | 31 | | |

## 十、其它要求

## Ⅹ Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

*Situation & Policy*, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term. The course will be arranged by the University Students' Affairs' Department in each school.

# 矿物加工工程专业（卓越工程师班）本科培养方案
# Undergraduate Educational Program of Specialty in Mineral Processing Engineering (Excellent Engineer Class)

## 一、业务培养目标

### Ⅰ Educational Objectives

本专业培养具备矿物（非金属、金属）分选加工、矿物材料制备、矿产资源综合利用相关的基础知识和基本技能，具有人文社会科学素养、社会责任感和工程职业道德，具备工程实践（设计、工程实验）能力，了解专业发展前沿方向，具有创新意识和国际视野与对外交流能力，能在矿物加工工程与矿物材料等相关领域从事建设规划、工程设计、生产与经营管理、研究开发等方面工作的工程技术人才，经过五年左右发展成为矿业工程师。

This Specialty aims at training engineering and technological personnel with basic knowledge in the fields of mineral (metallic and nonmetallic) separation and processing, mineral material preparation, comprehensive utilization of mineral resources.Those undergraduates also should own social science attainments,social responsibility and engineering profession morality,being able to undertake enginneering practise(including design and engineering experiments),knowing major developing forwards,posessing creative minds,international view and international communication ability. After about 5 years they will develop into qualified mineral engineers and can undertake the work in the area of building planning, design of process and equipment, management and administration, research and development in the institutions of planning and design.

## 二、业务培养要求

### Ⅱ Educational Requirement

本专业学生主要学习化学、外语、矿石与矿物、矿物加工工艺、矿物材料制备与应用及资源综合利用等方面的基本理论和基础知识，受到实验研究、工程设计方法、计算机应用及外语应用等方面的基本训练，具有矿物加工、矿物材料方面的研究、工程设计方面和现场管理等的基本能力。

毕业生应获得以下几个方面的知识能力：

1．掌握有关数学、化学、物理学等基本理论、基本知识；

2．掌握本专业所必需的矿物学与矿石学、机械、电工与电子技术、计算机应用的基本知识的技能；

3．掌握矿物（金属、非金属）材料科学的基本知识及材料性能检测、研究方法及产品质量控制的基本知识和技能；

4．掌握矿物加工企业管理、环境治理、选矿过程模拟与自动化等的基本知识

5．掌握矿物加工厂工艺工程设计的方法，并具有进行工艺设计的能力；

6．熟悉国家关于矿产资源开发、加工与利用方面的相关产业政策、国内外知识产权方面的法律法规；

7．掌握资料查询，文献检索以及运用现代信息技术获取相关信息的基本方法；具有一定的创新意识和进行科学研究的能力。

8．掌握一门外语，具有较好的语言应用能力，能阅读外文文献，进行基本的口语交流。

Students of this specialty mainly study the basic theories and fundamental knowledge in the fields of chemistry, foreign languages, ores and minerals, mineral processing technology, preparation and application of mineral materials, and comprehensive utilization of resources. The students are provided with basic training in the aspects of experimental research, engineering design methods, computer application and foreign language application. The students will possess basic ability of research and engineering design in the fields of mineral processing,and mineral materials .

The graduates should obtain the following knowledge and ability:

1. To master the fundamental theories and basic knowledge concerning mathematics, chemistry and physics.
2. To master the basic knowledge and ability necessary for this specialty, including mineralogy and lithology, mechanics, electrical and electronic technology, and application of computers.
3. To master the basic knowledge of mineral (metallic and nonmetallic) material science and the basic knowledge and ability of material characteristic testing, research methods and product quality control.
4. To master the basic knowledge of mineral processing corporation management,environment administration, mineral processing simulation and automation,et al.
5. To master the methods of engineering design of mineral processing plant and possess the ability of performing technological design.
6. To be familiar with the relevant nation industrial policies about the development, processing and utilization of mineral resources, domestic and foreign laws and regulations with respect to intellectual properties.
7. To master the basic methods of searching data, retrieving literatures and obtaining relevant information by using modern information technology, and to be trained with certain innovative consciousness and ability to conduct scientific research.
8. To master at least one foreign language, with excellent language application ability, being able to read literatures in foreign language and perform basic oral communication.

## 三、主干学科

## Ⅲ Major Disciplines

主干学科：矿业工程

Major Disciplines: Mine Engineering

## 四、专业核心课程与专业特色课程

## Ⅳ Core Courses and Characteristic Courses

专业核心课程：矿石学、无机化学、物理化学、矿物加工工艺学、化学选矿、矿物材料工艺学、矿物加工试验研究方法、矿物加工厂工艺设计等。

Core Courses: Lithology, inorganic chemistry, physical chemistry, mineral processing technology, chemical mineral processing, mineral material technology, experimental research methods in mineral processing, process design of mineral processing plant.

专业特色课程：矿石学、矿物加工工艺学、矿物材料工艺学、化学选矿

Characteristic Courses: Lithology, mineral processing technology, mineral material technology, chemical mineral processing.

## 五、计划学制与学位

## Ⅴ Length of School and Degree

修业年限：四年

Duration： Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineer

## 六、最低毕业学分规定

## Ⅵ Graduation Credit Criteria

| 课程类别 Course Classification / 课程性质 Course Nature | 通识课程 Public Basic Courses | 学科大类课程 Basic Courses in General Discipline | 专业课程 Courses in Specialty | 个性课程 Personalized Course | 集中性实践 Practice Courses | 课外学 Extracurricular Credits | 总学分 Total Credits |
|---|---|---|---|---|---|---|---|
| 必修课 Required Courses | 35 | 56 | 25.5 | \ | 36.5 | \ | 190 |
| 选修课 Elective Courses | 9 | 6 | 12 | \ | \ | 10 | |

## 七、课程修读指导建议

## Ⅶ Recommendations on Course Studies

## 八、理论教学建议进程表

## Ⅷ Theory Course Schedule

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课程名称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extracur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 通识课程 Public Basic Courses | 必修课 Required Courses | 4220001110 | 思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law | 3 | 48 | | | 8 | | 1-6 | | |
| | | 4220002110 | 中国近现代史纲要 Outline of Contemporary and Modern Chinese History | 2 | 32 | | | | | 1-6 | | |
| | | 4220003110 | 毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics | 4 | 96 | | | 32 | | 1-6 | | |
| | | 4220005110 | 马克思主义基本原理 Marxism Philosophy | 3 | 48 | | | 8 | | 1-6 | | |
| | | 1050001130 | 心理健康教育 Mental health education | 1 | 16 | | | | | 1-2 | | |
| | | 1060003130 | 军事理论 Military Theory | 1 | 32 | | | 16 | | 2-4 | | |
| | | 4210001110 | 体育 1 Physical Education Ⅰ | 1 | 32 | | | | | 1 | | |
| | | 4210002110 | 体育 2 Physical Education Ⅱ | 1 | 32 | | | | | 2 | 体育 1 | |
| | | 4210003110 | 体育 3 Physical Education Ⅲ | 1 | 32 | | | | | 3 | 体育 2 | |
| | | 4210004110 | 体育 4 Physical Education Ⅳ | 1 | 32 | | | | | 4 | 体育 3 | |
| | | 4030002110 | 大学英语 A1 College English A Ⅰ | 3 | 64 | | | | 16 | 1 | | |
| | | 4030003110 | 大学英语 A2 College English A Ⅱ | 3 | 64 | | | | 16 | 2 | 大学英语 A1 | |
| | | 4030004110 | 大学英语 A3 College English A Ⅲ | 3 | 64 | | | | 16 | 3 | 大学英语 A2 | |
| | | 4030005110 | 大学英语 A4 College English A Ⅳ | 3 | 64 | | | | 16 | 4 | 大学英语 A3 | |
| | | 4120017110 | 大学计算机基础 Foundation of Computer | 2 | 32 | | 12 | | | 1 | | |
| | | 程序设计语言课程组(三选一，3 学分) Computer Program Design Language Courses (Choice One, Crs.：3) | | | | | | | | | | |

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课程名称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extracur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4120023110 | 计算机程序设计基础(C 语言)<br>Fundamentals of Computer Program Design(C Language) | 3 | 48 | | 12 | | | 2 | | |
| | | 4120024110 | 计算机程序设计基础(FORTRAN 语言)<br>Fundamentals of Computer Program DesignFORTRAN Language) | 3 | 48 | | 12 | | | 2 | | |
| | | 4120025110 | 计算机程序设计基础(VB 语言)<br>Fundamentals of Computer Program Design(VB Language) | 3 | 48 | | 12 | | | 2 | | |
| | | 小 计 Subtotal | | 35 | 736 | | 24 | 64 | 64 | | | |
| | 选修课 Elective Courses | 创新创业类<br>Innovation and Entrepreneurship Courses | 全校学生要求至少取得 9 学分，建议在每个类别中分别至少选修一门课程。<br>All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively. | | | | | | | | | |
| | | 人文社科类<br>Arts and Social Science Courses | | | | | | | | | | |
| | | 经济管理类<br>Economy and Management Courses | | | | | | | | | | |
| | | 科学技术类<br>Science and Technology Courses | | | | | | | | | | |
| | | 艺术体育类<br>Art and Physical Education Courses | | | | | | | | | | |
| 学科大类课程 Basic Disciplinary Courses | 必修课 Required Courses | 4060214110 | 专业导论<br>Introduction to Materials Physics | 1 | 16 | | | | | 1 | | |
| | | 4050063110 | 高等数学 A 上<br>Advanced Mathematics AⅠ | 5 | 80 | | | | | 1 | | |
| | | 4050064110 | 高等数学 A 下<br>Advanced Mathematics AⅡ | 5 | 80 | | | | | 2 | 高等数学 A 上 | |
| | | 4050207110 | 无机化学 B 上<br>Chemistry BⅠ | 3 | 48 | | | | | 1 | | |
| | | 4050208110 | 无机化学 B 下<br>Chemistry BⅡ | 1.5 | 24 | | | | | 2 | 无机化学 B 上 | |
| | | 4050209110 | 无机化学 B 实验上<br>Inorganic Chemistry B ExperimentⅠ | 1 | 24 | 24 | | | | 1 | | |
| | | 4050210110 | 无机化学 B 实验下<br>Inorganic Chemistry B ExperimentⅡ | 0.5 | 24 | 24 | | | | 2 | 无机化学 B 实验上 | |
| | | 4080041110 | 工程图学 B<br>Engineering Drawing B | 4 | 64 | | 4 | | | 2 | | |
| | | 4050021110 | 大学物理 A 上<br>Physics AⅠ | 3.5 | 56 | | | | | 2 | | |
| | | 4050022110 | 大学物理 A 下<br>Physics AⅡ | 3.5 | 56 | | | | | 3 | 大学物理 A 上 | |
| | | 4050222110 | 物理实验 A 上<br>Physics Lab. AⅠ | 1 | 28 | 28 | | | | 3 | | |
| | | 4050223110 | 物理实验 A 下<br>Physics Lab. AⅡ | 1 | 28 | 28 | | | | 4 | 物理实验 A 上 | |
| | | 4050229110 | 线性代数<br>Linear Algebra | 2.5 | 40 | | | | | 2 | | |
| | | 4050071110 | 工程力学 A<br>Engineering Mechanics A | 4 | 64 | 4 | | | | 3 | | |
| | | 4050220110 | 物理化学 C<br>Physical Chemistry C | 4 | 64 | | | | | 3 | 无机化学 B 下 | |
| | | 4050221110 | 物理化学 C 实验<br>Physical Chemistry C Experimental | 0.5 | 16 | 16 | | | | 3 | | |

| 课程类别 Course Classification | 课程性质 Course Nature | 课程编号 Course Number | 课程名称 Course Title | 学分 Crs | 学时分配 Including 总学时 Tot hrs. | 实验 Exp. | 上机 Operation | 实践 Practice | 课外 Extra-cur | 建议修读学期 Suggested Term | 先修课程 Prerequisite Course | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4050058110 | 概率论与数理统计 B<br>Probability and Mathematics B | 3 | 48 | | | | | 4 | 高等数学 A 下 | |
| | | 4060128110 | 资源工程 CAD<br>Resource Engineering CAD | 2 | 32 | 24 | | | | 5 | 大学计算机基础 | |
| | | 4060015110 | 表面与胶体化学<br>Surface and Colloid Chemistry | 2.5 | 40 | | | | | 4 | 物理化学 C | |
| | | 4100012110 | 电工与电子技术基础 C<br>Fundamentals of Electrical and Electronic Technology C | 4 | 64 | 4 | 10 | | | 4 | 大学物理 A 下 | |
| | | 4080061110 | 机械设计基础<br>Mechanical Design Basis | 3.5 | 56 | 6 | | | | 5 | | |
| | | 小 计 Subtotal | | 56 | 952 | 164 | 14 | | | | | |
| | 选修课 Elective Courses | 4050251110 | 有机化学 C<br>Organic Chemistry | 3 | 48 | | | | | 2 | | |
| | | 4060052110 | 环境矿物材料<br>Environmental Mineral Materials | 2 | 32 | | | | | 3 | | |
| | | 4060129110 | 资源环境经济学<br>Resource and Environment Economics | 2 | 32 | | | | | 3 | | |
| | | 4060027110 | 地质学<br>Physical Geology | 2.5 | 40 | | | | | 4 | | |
| | | 4050134110 | 流体力学 C<br>Fluid Mechanics C | 3 | 48 | 6 | | | | 4 | | |
| | | 4070093110 | 建筑工程概论 B<br>Architecture Introduction B | 1 | 16 | | | | | 5 | | |
| | | 4060217110 | 采矿概论<br>Mining Introduction | 2 | 32 | | | | | 5 | | |
| | | 4080056110 | 机电一体化<br>Mechanical and Electrical Integration Introduction | 2 | 32 | | | | | 6 | | |
| | | 4060136110 | 总图与厂矿道路工程<br>Assembly Drawing and Road Engineering | 2 | 32 | | | | | 7 | | |
| | | 小 计 Subtotal | | 19.5 | 248 | 6 | | | | | | |
| | | 修读说明：要求至少选修 6 学分。<br>NOTE：Minimum subtotal class credits:6 | | | | | | | | | | |
| 专业课程 Specialized Courses | 必修课 Required Courses | 4200014110 | 化工基础<br>Elementary Chemical Industry | 3 | 48 | 8 | | | | 4 | 流体力学 C | |
| | | 4060243120 | 矿石学<br>Lithology | 3 | 48 | 16 | | | | 4 | | |
| | | 4060229120 | 粉碎工程<br>Comminution Engineering | 3 | 48 | | | 16 | | 5 | | |
| | | 4060246120 | 矿物加工工艺学<br>Mineral Processing Technology | 5 | 80 | | | | | 5 | 矿石学 | |
| | | 4060088110 | 矿物加工试验研究方法<br>Experimental Research Methods of Mineral Processing | 2 | 32 | | | | | 6 | | |
| | | 4060085110 | 矿物加工测试技术<br>Mineral Material Testing Techniques | 2 | 32 | | | | | 6 | 矿物加工试验研究方法 | |
| | | 4060232120 | 化学选矿<br>Chemical Mineral Processing | 2 | 32 | | | | | 7 | | |
| | | 4060244120 | 矿物加工厂工艺设计<br>Process Design of Mineral Processing Plant | 3 | 48 | | | 16 | | 7 | | |

| 课程类别 Course Classifi-cation | 课程性质 Course Nature | 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 | 第二专业 Second Major |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 总学时 Tot hrs. | 实验 Exp. | 上机 Ope-ration | 实践 Prac-tice | 课外 Extra-cur | | | |
| | | 4060083110 | 矿物材料工艺学<br>Mineral Material Technology | 2.5 | 40 | | | | | 6 | | |
| | | 小 计 Subtotal | | 25.5 | 408 | 24 | | 32 | | | | |
| | 选修课 Elective Courses | 4060276130 | 环境工程概论<br>Environment Engineering Introduction | 2 | 32 | | | | | 3 | | |
| | | 4060028110 | 二次资源开发利用<br>Exploitation and Utilization of Secondary | 2 | 32 | | | | | 5 | | |
| | | 4060084110 | 矿物粉体工程<br>Mineral Powder Technology | 2 | 32 | | | | | 5 | | |
| | | 4060093110 | 矿业技术经济学<br>Economics of Mining Technology | 2 | 32 | | | | | 5 | | |
| | | 4060102110 | 烧结球团工艺学<br>Sintering Pelletizing Process | 2 | 32 | | | | | 6 | | |
| | | 4060312130 | 选矿过程模拟与自动化<br>Mineral Processing Simulation Automation and Automation | 2 | 32 | | | | | 6 | 机电一体化 | |
| | | 4060031110 | 非金属矿物新型建筑材料<br>New Nonmetallic Mineral Building | 2 | 32 | | | | | 6 | | |
| | | 4060036110 | 固液分离技术<br>Solid-liquid Separation Techniques | 2 | 32 | | | | | 6 | | |
| | | 4060120110 | 选矿药剂<br>Mineral Processing Reagents | 2 | 32 | | | | | 7 | | |
| | | 4060079110 | 矿山企业管理<br>Mine Corporation Management | 2 | 32 | | | | | 6 | | |
| | | 4060119110 | 选矿工艺与实例<br>Technics and Examples of Mineral | 2 | 32 | | | | | 7 | | |
| | | 小 计 Subtotal | | 22 | 352 | | | | | | | |
| | | 修读说明：要求至少选修 12 学分<br>NOTE: Minimum subtotal credits:12 | | | | | | | | | | |

## 九、集中性实践教学环节建议进程表

## Ⅸ Practice Schedule

| 课程编号 Course Number | 实践环节名称 Practice Courses Name | 周数 Weeks | 学分 Crs | 建议修读学期 Suggested Term | 第二专业 Second Major |
|---|---|---|---|---|---|
| 1060002110 | 军事训练<br>Military Training | 3 | 1.5 | 1 | |
| 4060199110 | 认识实习<br>Cognition Practice | 1 | 1 | 2(暑期) | |
| 4100069110 | 电工电子实习<br>Electric Practice | 1 | 1 | 4 | |
| 4080151110 | 机械制造工程实训 C<br>Machinery Manufacturing Engineering Practice C | 2 | 2 | 4 | |
| 4080146110 | 机械设计基础课程设计<br>Course Design on Foundation of Machine Design | 2 | 2 | 5 | |
| 4060269120 | 矿物系统鉴定实验<br>Mineral Identify | 2 | 2 | 5 | |
| 4060267120 | 矿物加工工艺学系统实验 1<br>Systematic Experiments of Mineral Processing Technology | 1.5 | 1.5 | 6 | |

| 课程编号<br>Course Number | 实践环节名称<br>Practice Courses Name | 周数<br>Weeks | 学分<br>Crs | 建议修读学期<br>Suggested Term | 第二专业<br>Second Major |
|---|---|---|---|---|---|
| 4060268120 | 矿物加工工艺学系统实验 2<br>Systematic Experiments of Mineral Processing Technology | 2 | 2 | 7 | |
| 4060207110 | 专业实习（生产实习）<br>Professional (Production) Practice | 3 | 3 | 6 | |
| 4060263120 | 岗位实习<br>Occupation Practice | 5.5 | 5.5 | 7 | |
| 4060186110 | 矿物材料工艺学系统实验<br>Systematic Experiments of Mineral material Technology | 1.5 | 1.5 | 7 | |
| 4060184110 | 矿石可选性综合实验<br>Serial Experiments of Ore Beneficiation Feasibility | 1.5 | 1.5 | 7 | |
| 4060152110 | 毕业实习<br>Graduation Practice | 2 | 2 | 8 | |
| 4060261120 | 毕业设计（论文）<br>Graduation Design (Dissertation) | 15 | 10 | 8 | |
| 小　　计　Subtotal | | 42.5 | 36.5 | | |

## 十、其它要求

## Ⅹ Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

*Situation & Policy*, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term . The course will be arranged by the University Students' Affairs' Department in each school.