**【制药工程专业】2015版本科培养方案**

**Undergraduate Education Plan for Specialty in Pharmaceutical Engineering (2015)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 专业名称 | **制药工程** | 主干学科 | **化学、药学、化学工程与技术** | |
| Major | Pharmaceutical Engineering | Major Disciplines | Chemistry, Pharmacy, Chemical Engineering and Technology | |
| 计划学制 | **四年** | 授予学位 | | **工学学士** |
| Duration | 4 Years | Degree Granted | | Bachelor of Engineering |

**最低毕业学分规定**

**Graduation Credit Criteria**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 课程类Course Classification  课程性质  Course Nature | 通识课程  Public Basic Courses | 学科大类课程  Basic Disciplinary Courses | 专业课程  Specialized Courses | 个性课程  Personalized Course | 集中性实践  Practice Courses | 课外学分  Study Credit after Class | 总学分  Total  Credits |
| 必修课  Required Courses | 35 | 50 | 36.5 | \ | 27.5 | \ | 190 |
| 选修课  Elective Courses | 9 | \ | 12 | 10 | \ | 10 |

1. **培养目标与毕业要求**

**Ⅰ Educational Objectives &Requirement**

1. **培养目标**

本专业培养具备制药工程方面较宽的基础知识，能在医药、农药、精细化工和生物化工等行业从事相关产品的生产管理、技术开发、工艺和设备设计、技术改造和经营管理等方面的工作，适应社会主义市场经济发展的高层次、高素质、全面发展的科学研究与工程技术人才。

This program cultivates executives who possess the wide and basic knowledge of Pharmaceutical Engineering. They can engage in product management, technological development, technique process and equipment design, technological transformation and management of work in medicine, pesticides, chemical and biochemical and other industries. They can also adapt to the development of social market economy and have the high-quality, comprehensive development of scientific research and engineering technology.

1. 身心健康，具备良好的敬业精神、社会责任感和工程职业道德，关注社会问题，具有质量意识、环境意识和安全意识。
2. 掌握化学制药、中药制药、药物制剂制造技术与工程的基本理论、基本知识；
3. 掌握药物生产装置工艺与设备设计方法，具有对药品新资源、新产品、新工艺进行研究、开发和设计的初步能力；
4. 熟悉国家关于化工与制药生产、设计、研究与开发，环境保护等方面的方针、政策和法规；
5. 了解制药工程与制剂方面的理论前沿，了解新工艺、新技术与新设备的发展动态；
6. 具有创新意识和独立获得知识的能力，具备在科研院所、设计院、高等院校和制药及相关企业从事创业、产品开发、工程设计、教学研究、科学管理及技术服务等工作的能力。

**ⅠEducational Objectives**

This program cultivates executives who possess the wide and basic knowledge of Pharmaceutical Engineering. They can engage in product management, technological development, technique process and equipment design, technological transformation and management of work in medicine, pesticides, chemical and biochemical and other industries. They can also adapt to the development of social market economy and have the high-quality, comprehensive development of scientific research and engineering technology.

1. Physical and mental health;cultivating good professional dedication, social responsibility and engineering ethics;paying close attention to social issues; establishing quality awareness, environmental awareness and safety awareness.
2. Master the basic theory and basic knowledge of chemical pharmaceuticals, traditional Chinese medicine pharmacy and the manufacturing technology and engineering of pharmaceutical formulations;
3. Master the drug production process and equipment design methods, with an initial capacity of the development and design of new drug resources, new products and new technology research;
4. Familiar with national guidelines, policies and regulations on aspects of chemical and pharmaceutical production, design, research and development, environmental protection and so on;
5. Understand the forefront of pharmaceutical engineering and theoretical aspects of the preparation, the developments in new technology, new technology and new equipment;
6. Have the ability of independent innovation and access to knowledge, be able to work in scientific research institutes, design institutes, universities and pharmaceutical and related companies engaged in entrepreneurship, product development, engineering design, teaching and research, scientific and technical services, management of work .
7. **毕业要求**

在较熟练和全面掌握化学基础知识的同时，主要学习制药工程方面的基本理论和基本知识，掌握化工单元操作、药物化学、生物化学、药理学、制药工艺学等专业理论知识，并接受化工制药实验技能、工程实践、计算机应用、科学研究与工程设计方法的基本训练，具有对医药产品的生产、工程设计、新药的研制与开发的能力。

毕业生应获得以下几方面的知识和能力：

1. 掌握马克思主义、毛泽东思想基本原理、邓小平理论和“三个代表”的重要思想，品德高尚，身心健康；
2. 掌握化学制药、中药制药、生物制药、药物制剂工程的基本理论知识；
3. 掌握药物生产工艺、药厂车间设计，具有工程运算和设计能力；
4. 具有在医药、农药、精细化工等企业、研究院所、经营管理部门，从事教学、科研、开发及经营管理工作的能力；
5. 熟悉制药生产、环境保护等方面的法律和法规；
6. 了解制药工程的理论前沿、应用前景和最新发展动态；
7. 较好地掌握一门外国语，具有查阅文献的能力，具备熟悉阅读专业书刊和查阅相关专业文献能力；
8. 具有一定的计算机知识和应用能力；
9. 具有较强的自学能力和创新能力。

**II Graduation Requirement**

Students of this major mainly learn basic theories of Chemistry as well as basic theories and knowledge of Pharmaceutical Engineering. They must master professional theories knowledge of chemical units operation, medicinal chemistry, biochemistry, pharmacology and pharmaceutical technology, and have training on chemistry experiment technology, engineering practice, computer application, scientific research and engineering design methods. They have the ability on producing medicine, engineering design, exploiting and developing new drugs.

Knowledge and abilities must be acquired

1. Good personality, physical and psychological competence, mastery of the Marxism basic principle, Mao Zedong thought, Deng Xiaoping theory and the important thought of the "Three Represents";
2. Master basic knowledge of chemical pharmacy, traditional Chinese drug, biological pharmacy, pharmaceutical preparation engineering.
3. Master the technology of drug manufacturing, workshop design, the abilities of engineering calculation and design.
4. Have the abilities to engage in education, research, exploiting, business and administration, in the following units: medicine, pesticides and chemical enterprise, research academy, business and administration department.
5. Become acquired with rules and laws of drug manufacturing, environmental protection.
6. Comprehend the on-the-edge theories, prospects of application and present progress situation.
7. Master a foreign language to look up scientific resources and read professional books and journals.
8. Possess the capabilities about computer knowledge and application.
9. Have good abilities to self-learning and innovation.

附：培养目标实现矩阵

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 培养目标1 | 培养目标2 | 培养目标3 | 培养目标4 | 培养目标5 | 培养目标6 |
| 毕业要求1 | 🗸 |  |  |  |  |  |
| 毕业要求2 |  | 🗸 |  |  |  | 🗸 |
| 毕业要求3 |  |  | 🗸 |  |  | 🗸 |
| 毕业要求4 |  |  | 🗸 | 🗸 |  | 🗸 |
| 毕业要求5 |  |  |  | 🗸 |  | 🗸 |
| 毕业要求6 |  |  |  |  | 🗸 | 🗸 |
| 毕业要求7 |  |  |  |  | 🗸 | 🗸 |
| 毕业要求8 |  |  |  |  |  | 🗸 |
| 毕业要求9 |  |  |  |  |  | 🗸 |

1. **专业核心课程与专业特色课程**

**II Core Courses and Characteristic Courses**

1. **专业核心课程：**

化工原理、药物合成反应、药物化学、工业药剂学、制药工艺学、制药工程

**Core Courses:** The Principle of Chemical Engineering, Organic Reaction of Drug Synthesis, Medicinal Chemistry, Industrial pharmaceutics, Pharmaceutical technology, Pharmaceutical Engineering

1. **专业特色课程：**

药品生产质量管理工程、制药分离工程、制药反应工程、药理学、天然药物化学、药物分析

**Characteristic Courses:**Good Manufacturing Engineering, Pharmaceutical Separation Engineering, Engineering of pharmaceutical chemical reaction, Pharmacology, Natural Medicinal Chemistry, Medicinal Analysis

附：毕业要求实现矩阵：

| **专业核心课程** | **专业特色课程** | **课程名称** | **制药工程专业毕业要求** | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| （1） | （2） | （3） | （4） | （5） | （6） | （7） | （8） | （9） |
|  |  | 思想道德修养与法律基础 | √ |  |  |  |  |  |  |  |  |
|  |  | 中国近现代史纲要 | √ |  |  |  |  |  |  |  |  |
|  |  | 毛泽东思想和中国特色社会主义理论体系概论 | √ |  |  |  |  |  |  |  |  |
|  |  | 马克思主义基本原理 | √ |  |  |  |  |  |  |  |  |
|  |  | 军事理论 | √ |  |  |  |  |  |  |  | √ |
|  |  | 体育 | √ |  |  |  |  |  |  |  |  |
|  |  | 大学英语 |  |  |  |  |  |  | √ |  |  |
|  |  | 大学计算机基础 |  |  | √ |  |  |  |  | √ |  |
|  |  | 计算机程序设计基础(C语言) |  |  | √ |  |  |  |  | √ |  |
|  |  | 心理健康教育 | √ |  |  |  |  |  |  |  | · |
|  |  | 专业导论 |  |  |  |  | √ | √ |  | · | · |
|  |  | 高等数学A |  | √ |  |  |  |  |  |  |  |
|  |  | 线性代数 |  | √ |  |  |  |  |  |  |  |
|  |  | 概率论与数理统计B |  | √ |  |  |  |  |  |  |  |
|  |  | 工程图学B |  | √ |  |  |  |  |  |  |  |
|  |  | 大学物理B |  | √ |  |  |  |  |  |  |  |
|  |  | 物理实验B |  | √ |  |  |  |  |  |  |  |
|  |  | 电工与电子技术基础C |  | √ |  |  |  |  |  |  |  |
|  |  | 无机化学C |  | √ |  |  |  |  |  |  |  |
|  |  | 无机化学C实验 |  | √ |  |  |  |  |  |  |  |
|  |  | 分析化学C |  | √ |  |  |  |  |  |  |  |
|  |  | 分析化学C实验 |  | √ |  |  |  |  |  |  |  |
|  |  | 有机化学B |  | √ |  |  |  |  |  |  |  |
|  |  | 有机化学B实验 |  | √ |  |  |  |  |  |  |  |
|  |  | 物理化学C |  | √ |  |  |  |  |  |  |  |
|  |  | 物理化学B实验 |  | √ |  |  |  |  |  |  |  |
|  |  | 化工制图 |  | √ | √ |  |  |  |  |  |  |
|  | √ | 药品生产质量管理工程 |  |  |  | √ | √ |  |  |  |  |
|  | √ | 制药分离工程 |  |  | √ | √ |  |  |  |  |  |
|  | √ | 制药反应工程 |  |  | √ | √ |  |  |  |  |  |
| √ |  | 化工原理 |  | √ | √ |  |  |  |  |  |  |
|  |  | 化工原理实验 |  | √ | √ |  |  |  |  |  |  |
| √ |  | 药物合成反应B |  | √ |  | √ |  |  |  |  |  |
| √ |  | 工业药剂学 |  | √ |  | √ |  |  |  |  |  |
|  | √ | 药理学B |  | √ |  | √ |  |  |  |  |  |
|  | √ | 天然药物化学A |  | √ |  | √ |  |  |  |  |  |
|  | √ | 药物分析 |  | √ |  | √ |  |  |  |  |  |
| √ |  | 药物化学 |  | √ |  | √ |  |  |  |  |  |
|  |  | 制药工程基础实验 |  | √ |  | √ |  |  |  |  |  |
| √ |  | 制药工程B |  | √ | √ | √ |  |  |  |  |  |
| √ |  | 制药工艺学 |  | √ | √ | √ |  |  |  |  |  |
|  |  | 专业综合实验 |  | √ |  | √ |  |  |  |  | √ |
|  |  | 生物药剂学与药物动力学 |  | √ |  | √ |  |  |  |  |  |
|  |  | 药事管理学与新药研究 |  |  |  | √ | √ | √ |  |  |  |
|  |  | 中药学 |  | √ |  | √ |  |  |  |  |  |
|  |  | 药用高分子材料 |  | √ |  | √ |  |  |  |  |  |
|  |  | 仪器分析与波谱解析B |  | √ |  | √ |  |  |  |  |  |
|  |  | 生物技术药物 |  | √ |  | √ |  |  |  |  |  |
|  |  | 生药学 |  | √ |  | √ |  |  |  |  |  |
|  |  | 药物合成设计 |  | √ |  | √ |  |  |  |  |  |
|  |  | 药物设计学 |  | √ |  | √ |  |  |  |  | √ |
|  |  | 生物化学B |  | √ |  | √ |  |  |  |  |  |
|  |  | 药物制剂设计与工艺 |  | √ |  | √ |  |  |  |  |  |
|  |  | 微生物学C |  | √ |  | √ |  |  |  |  |  |
|  |  | 医学基础 |  | √ |  | √ |  |  |  |  |  |
|  |  | 制药过程安全与环保 |  |  |  | √ | √ |  |  |  |  |
|  |  | 中药制剂分析 |  | √ |  | √ |  |  |  |  |  |
|  |  | 制药设备与车间设计 |  |  | √ | √ |  |  |  |  |  |
|  |  | 医药知识产权与文献检索 |  |  |  |  | √ | √ | √ |  |  |
|  |  | 制药工程前沿 |  |  |  |  |  | √ |  |  | √ |
|  |  | 制药工程专业外语 |  |  |  |  |  |  | √ |  |  |
|  |  | 军事训练 | √ |  |  |  |  |  |  |  | √ |
|  |  | 机械制造工程实训C | √ |  |  |  |  |  |  |  | √ |
|  |  | 电工电子实习B | √ |  |  |  |  |  |  |  | √ |
|  |  | 化工原理课程设计 |  | √ | √ | √ |  |  |  |  |  |
|  |  | 专业实习 |  |  | √ | √ |  |  |  |  | √ |
|  |  | 能力拓展训练 |  |  | √ | √ |  |  |  |  | √ |
|  |  | 毕业设计(毕业论文) |  | √ | √ | √ | √ | √ | √ | √ | √ |

1. **课程教学进程图**

**Ⅲ Teaching Process Map**



1. **理论教学建议进程表**

**Ⅳ 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 | | | | | 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 |
| 通 识 课 程 Public Basic Courses  General Education Elective  Coures | 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 EducationⅠ | 1 | 32 |  |  |  |  | 1 |  |  |
| 4210002110 | 体育2  Physical Education Ⅱ | 1 | 32 |  |  |  |  | 2 | 体育1 |  |
| 4210003110 | 体育3  Physical EducationⅢ | 1 | 32 |  |  |  |  | 3 | 体育2 |  |
| 4210004110 | 体育4  Physical EducationⅣ | 1 | 32 |  |  |  |  | 4 | 体育3 |  |
| 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 |  |
| 1050001130 | 心理健康教育  Psychological health education | 1 | 16 |  |  |  |  | 1-2 |  |  |
| 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) | | | | | | | | | | |
| 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 |  |  |  |  |  |  |  |
| 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个学分，且必须选修艺术体育类课程中的艺术类相关课程，取得至少2个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程，其他专业学生至少选修一门科学技术类课程。  All students are required to obtain at least 9 credits, and must select art courses from *Art and Physical Education Courses*toobtain at least 2 credits*.* Science and engineering students should select at least one course from *Arts and Social Science Courses*or*Economy and Management Courses*, and other students should select at least one course from *Science and Technology Courses*. | | | | | | | | |
| 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 | 4200067110 | 专业导论  Introduction to Materials Physics | 1 | 16 |  |  |  |  | 1 |  |  |
| 4200325140 | 无机化学C  Inorganic Chemistry C | 3.5 | 56 |  |  |  |  | 1 |  |  |
| 4200326140 | 无机化学C实验  Experiment in Inorganic Chemistry C | 0.5 | 16 | 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 |  |
| 4080041110 | 工程图学B  Engineering Cartography B | 4 | 64 |  | 4 |  |  | 2 |  |  |
| 4200303120 | 分析化学C  Analysis Chemistry C | 1.5 | 24 |  |  |  |  | 2 |  |  |
| 4200304120 | 分析化学C实验  Experiment of Analysis Chemistry C | 1 | 32 | 32 |  |  |  | 2 |  |  |
| 4200023110 | 化工制图  Chemical Cartography | 2 | 32 |  |  |  |  | 3 |  |  |
| 4050229110 | 线性代数  Linear Algebra | 2.5 | 40 |  |  |  |  | 3 |  |  |
| 4200312120 | 有机化学 B  Organic Chemistry C | 4.5 | 72 |  |  |  |  | 3 |  |  |
| 4200313120 | 有机化学B实验  Experiment in Organic Chemistry C | 1.5 | 48 | 48 |  |  |  | 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 |  |
| 4200256120 | 物理化学C  Physical Chemistry C | 4 | 64 |  |  |  |  | 4 |  |  |
| 4200182130 | 物理化学B实验  Experiment of Physical Chemistry C | 1 | 32 | 32 |  |  |  | 4 |  |  |
| 4050058110 | 概率论与数理统计B  Probability and Mathematical Statistics B | 3 | 48 |  |  |  |  | 4 |  |  |
| 4100012110 | 电工与电子技术基础C  Fundamentals of Electrical Engineering & Electric Technology C | 4 | 64 | 10 |  |  |  | 4 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 小计 Subtotal | | 50 | 880 | 170 | 4 |  |  |  |  |  |
| 专 业 课 程Specialized Courses | 必 修 课 Required Courses | 4200021110 | 化工原理1  Principles of Chemical EngineeringⅠ | 3 | 48 |  |  |  |  | 4 |  |  |
| 4200120120 | 化工原理实验1  Experiments of Chemical Engineering PrincipleⅠ | 1 | 32 | 32 |  |  |  | 4 | 化工原理1 |  |
| 4200022110 | 化工原理2  Principles of Chemical EngineeringⅡ | 3 | 48 |  |  |  |  | 5 | 化工原理1 |  |
| 4200121120 | 化工原理实验2  Experiments of Chemical Engineering PrincipleⅡ | 1 | 32 | 32 |  |  |  | 5 |  |  |
| 4200049110 | 药物合成反应B  Organic Reaction of Drug Synthesis B | 3 | 48 |  |  |  |  | 5 |  |  |
| 4200324140 | 工业药剂学  Industrial pharmaceutics | 3 | 48 |  |  |  |  | 5 |  |  |
| 4200045110 | 药理学B  Pharmacology B | 2.5 | 40 |  |  |  |  | 5 |  |  |
| 4200178130 | 天然药物化学A  Natural Medicinal Chemistry A | 2.5 | 40 |  |  |  |  | 6 |  |  |
| 4200105110 | 药物分析  Medicinal Analysis | 2.5 | 40 |  |  |  |  | 6 |  |  |
| 4200051110 | 药物化学  Medicinal Chemistry | 3 | 48 |  |  |  |  | 6 |  |  |
| 4200046110 | 药品生产质量管理工程  Good Manufacturing Engineering | 2 | 32 |  |  |  |  | 7 |  |  |
| 4200104110 | 制药分离工程  Pharmaceutical Separation Engineering | 2 | 32 |  |  |  |  | 7 |  |  |
| 4200323140 | 制药反应工程  Engineering of pharmaceutical chemical reaction | 2 | 32 |  |  |  |  | 7 | 化工原理1 |  |
| 4200187130 | 制药工程B  Pharmaceutical Engineering B | 4 | 96 |  |  | 64 |  | 7 | 化工原理2/化工原理课程设计 |  |
| 4200062110 | 制药工艺学  Pharmaceutical Technology | 2 | 32 |  |  |  |  | 7 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 小计 Subtotal | | 36.5 | 648 | 64 |  | 64 |  |  |  |  |
| 选 修 课  Elective Courses | 4200037110 | 生物药剂学与药物动力学  Biopharmaceutics and Pharmacokinetics | 2 | 32 |  |  |  |  | 5 |  |  |
| 4200047110 | 药事管理学与新药研究  Pharmacy Administration and New Drug  Research | 2 | 32 |  |  |  |  | 5 |  |  |
| 4200064110 | 中药学  Traditional Chinese Medicine  Conspectus | 2 | 32 |  |  |  |  | 5 |  |  |
| 4200054110 | 药用高分子材料  Polymeric Materials in Drugs | 2 | 32 |  |  |  |  | 5 |  |  |
| 4200057110 | 仪器分析与波谱解析B  Spectroscopic and Instrumental Analysis B | 2 | 32 |  |  |  |  | 5 |  |  |
| 4200174130 | 生物化学B  Biochemistry B | 2 | 32 |  |  |  |  | 5 |  |  |
| 4200055110 | 医学基础  Medicine Basis | 2 | 32 |  |  |  |  | 5 |  |  |
| 4200036110 | 生物技术药物  Biological Medicine | 2 | 32 |  |  |  |  | 6 |  |  |
| 4200038110 | 生药学  Pharmacognosy | 2 | 32 |  |  |  |  | 6 |  |  |
| 4200050110 | 药物合成设计  Design for Drug Synthesis | 2 | 32 |  |  |  |  | 6 |  |  |
| 4200052110 | 药物设计学  Drug Design and Delivery | 2 | 32 |  |  |  |  | 6 |  |  |
| 4200108110 | 药物制剂设计与工艺  Pharmaceutical Design and Technology | 2 | 32 |  |  |  |  | 6 |  |  |
| 4200042110 | 微生物学C  Microbiology C | 2 | 32 |  |  |  |  | 7 |  |  |
| 4200063110 | 制药过程安全与环保  Safety and Environment Protection  in Pharmaceutical Process | 2 | 32 |  |  |  |  | 7 |  |  |
| 4200065110 | 中药制剂分析  Analysis in Traditional Chinese Medicine Pharmaceutics | 2 | 32 |  |  |  |  | 7 |  |  |
| 4200131120 | 制药设备与车间设计  Pharmaceutical Apparatus and Workshop Design | 2 | 32 |  |  |  |  | 7 |  |  |
| 4200103110 | 医药知识产权与文献检索  Medicinal Knowledge Property and Literature Retrieval | 2 | 32 |  | 12 |  |  | 7 |  |  |
| 4200060110 | 制药工程前沿  Development of pharmaceutical  engineering | 2 | 32 |  |  |  |  | 7 |  |  |
| 4200061110 | 制药工程专业外语  Specialized English of Pharmaceutical Engineering | 2 | 32 |  |  |  |  | 7 |  |  |
| 小计 Subtotal | | 38 | 608 |  | 12 |  |  |  |  |  |
| 修读说明：要求至少选修12学分。  NOTE：Minimum subtotal credits: 12. | | | | | | | | | | |
| 个性课程  Personalized Course | 选修课  Elective Courses | 4200089110 | 化工设备机械基础  Mechanical Base For Chemical Equipment | 2 | 32 |  |  |  |  | 5 |  |  |
| 4200018110 | 化工设计B  Chemical Process Design B | 2 | 32 |  |  |  |  | 7 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 小计 Subtotal | | 4 | 64 |  |  |  |  |  |  |  |
| 修读说明：学生需要修读以上课程至少4学分，余下学分可跨专业自主选择修读全校其他专业的课程。要求至少选修10学分。  NOTE：Students need to choose the courses above at least 4 credits. For the remaining credits, students can choose any courses from the other specialties. Minimum subtotal credits: 10. | | | | | | | | | | |

1. **集中性实践教学环节**

**Ⅴ 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  Military Training | 3 | 1.5 | 1 |  |
| 4080151110 | 机械制造工程实训C  Machinery Manufacturing Engineering Practice C | 2 | 2 | 4 |  |
| 4100069110 | 电工电子实习B  Practice in Electrical Engineering & Electronics B | 1 | 1 | 5 |  |
| 4200087110 | 化工原理课程设计  Course Design of Principles of Chemical Industry | 2 | 2 | 5 |  |
| 4200080110 | 专业实习  Practice of Specialty | 4 | 4 | 6 |  |
| 4200076110 | 能力拓展训练  Ability Development Training | 1 | 1 | 6（暑期） |  |
| 4200077110 | 制药工程基础实验  Basic Experiment of Pharmaceutical Engineering | 2 | 2 | 6 |  |
| 4200081110 | 专业综合实验  Specialized Integrated Experiment | 3 | 3 | 7 |  |
| 4200156130 | 毕业设计(毕业论文)  Graduation Design(Thesis) | 17 | 11 | 8 |  |
| 小计 Subtotal | | 35 | 27.5 |  |  |

1. **修读指导**

**Ⅵ Recommendations on Course Studies**

《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 7thterm . The course will be arranged by the University Students’ Affairs’ Department in each school.

学院教学责任人：张光旭

专业培养方案责任人：滕汉兵