|  |  |  |  |
| --- | --- | --- | --- |
| 院教学指导委员主任（院长） | 学院分管教学副院长 | 审核人（专业责任教授负责人） | 执笔人 |
|  |  |  |  |

**机械电子工程专业培养方案**

**Curriculum for Undergraduate of Mechanical and Electronic Engineering Major**

**一、培养目标**

本专业培养具有良好人文素养、较强社会责任感和职业道德，德、智、体、美、劳全面发展，具有厚实的自然科学和机械电子工程基础理论知识，具备较强计算机和外语应用能力、工程实践能力和终身学习能力，富有创新创业精神和国际视野，能够适应我国机械行业智能制造转型升级要求的高素质应用型人才。毕业学生能在冶金机械工程及相关领域从事设计、制造、检测与控制等方面科学研究、技术研发、设计创新、工程组织管理等工作，并期待毕业5年左右达成以下目标：

目标1：具有良好的人文社会科学素养和社会责任感，能够在工作中自觉遵守职业道德和规范，并履行相关责任和义务；

目标2：能够掌握扎实的专业基础理论、设计合理的实验方案和运用现代工具，分析和解决机电系统设计、开发、检测、自动控制和工程管理等实践中遇到的复杂工程问题；

目标3：熟悉机械电子工程领域行业规范和法律法规，能在工程实践中充分考虑工程与社会、环境、法律、安全、健康以及文化的关系，促进社会的可持续性发展；

目标4：能够持续关注国内外光机电系统、智能制造、互联网+环境下的机械电子工程及其相关领域的最新进展；

目标5：富有创新创业精神和终身学习意识，能通过自主学习有意识地完善实际工作所需的机械电子工程专业知识体系，掌握先进的检测工具和分析手段，能够利用创新性思维解决复杂工程问题；

目标6：具备良好的沟通、协调和领导能力以及外语应用能力，具有良好的国际视野，能在多学科、多文化背景下的工程项目管理团队和工程研发团队中担任负责人。

**I. Training objectives**

The major aims at developing skilled technology engineer with good humanity accomplishment, stronger sense of responsibility and good professional ethics, overall development of moral, intellectual, physical, aesthetics and labor education, and with the solid general knowledge, the reasonable knowledge structure, adaptable, innovative and entrepreneurial spirit and practical ability to engage in the job of electrical and mechanical products and system design, manufacturing, test and information technology development, mechatronics system control, scientific research and production organization and management. Graduates of the major are supposed to achieve the following objectives in five years:

Aim 1: having good humanities sciences and social sciences, and having a sense of social responsibility, can abide professional ethics and norms in the work and perform duties and fulfil obligations consciously.

Aim 2: having solid general knowledge, can analyze and solve the complicated engineering problems encountered in mechatronics product design, development, testing, automatic control and engineering management through reasonable experimental scheme and modern tools.

Aim 3: familiar with the industry specifications, laws and regulations in the field of mechatronics engineering, can consider the relationship between engineering and society, environment, law, safety, health and culture in engineering practice to promote the sustainable development of society;

Ami 4: staying focus on latest developments in mechatronics engineering and related disciplines under the background of opto-mechatronics, intelligent manufacturing and the internet+ environment;

Aim 5: having spirit of innovation and lifelong learning, can consciously improve the mechatronics engineering knowledge system and master advanced analysis methods needed in engineering practice by self-learning;

Aim 6: having good communication skill, leadership skill and advanced ability of foreign language application, and can serve as a leader in engineering project management team and R&D team with multi-disciplinary and multi-cultural background.

**二、毕业要求**

本专业正在执行的毕业要求及指标点分解如表2.1所示。

**表2.1武汉科技大学机械电子工程专业毕业要求及指标点分解**

| **毕业要求** | **毕业要求指标点分解** |
| --- | --- |
| **1.工程知识：**掌握数学、自然科学、工程基础和机械工程专业知识，能够运用这些知识解决机械电子工程特别是机电系统设计、智能控制、检测分析与故障诊断等相关复杂工程问题。 | 1.1 能够将数学和自然科学知识用于机械设计、制造、自动控制等复杂机械工程问题中涉及的数学建模、数值计算和求解等基础问题。 |
| 1.2 掌握力学、热流体、电工电子、控制理论、材料科学等工程基础知识，并能运用这些知识分析和解决机电系统设计、制造、自动控制等复杂工程问题中涉及的运动学、动力学、控制方法和材料性能评价等工程基础问题。 |
| 1.3 掌握机电一体化系统设计、智能制造、测试及控制等机械电子工程专业知识，能运用这些知识分析和解决机电系统中涉及的机构与机械系统设计、液压与电气系统设计、智能控制、检测分析与故障诊断等复杂工程问题。 |
| 2.**问题分析：**能够独立进行专业资料及文献搜集整理和归纳总结，能将数学、自然科学、机械电子工程专业理论与文献分析相结合，对机电系统中的复杂工程问题加以识别、表达和分析，以获得有效结论。 | 2.1 掌握机械电子工程专业文献检索及资料搜集的方法，并能通过文献分析对具体工程问题的研究背景、研究现状、分析方法等进行归纳、总结。 |
| 2.2能综合应用数学、自然科学、机械电子工程基础理论和文献分析识别机械电子工程特别是机电系统设计、控制及检测维护相关的复杂工程问题，能够运用工程语言对所提出的复杂工程问题加以表达。 |
| 2.3能综合应用数学、自然科学、机械电子工程基础理论和文献分析对所提出的复杂机械工程问题涉及的技术指标、关键参数、主要因素及目标等进行深入分析，以获得有效结论。 |
| 3.**设计/开发解决方案：**能够针对机械电子工程特别是冶金行业高温、重载等工作需求的机电系统设计开发提出解决方案，并能在解决方案中体现创新意识。能够在设计方案中统筹兼顾技术性能指标与安全、健康、环境、法律、文化、社会等约束条件。 | 3.1 能够根据机械电子工程特别是冶金行业机电系统中的复杂工程问题所涉及的工程原理、关键问题及技术难点等选择合适的分析方法和流程，制定合理的解决方案，并进行技术可行性论证。 |
| 3.2 能够完成满足特定需求的结构或部件设计、传动系统设计及智能控制系统设计等，特别是适应冶金生产高温、重载等特定需求的机电系统，并在其中运用创新思维和方法。 |
| 3.3 能够在设计与开发机电系统特别是冶金行业机电系统相关的工程实践过程中综合考虑社会、健康、安全、法律法规、当地文化以及环境友好等多重约束条件。 |
| 4.**研究：**能够根据机械电子工程特别是机电一体化系统相关复杂工程问题所涉及的科学领域、工程原理和运行工况，选取合适的科学方法进行研究，能够进行验证性实验及工业现场调试检测方案设计、数据分析与解释，并通过信息综合得到合理有效的结论。 | 4.1 能够设计合理的科学实验以完成复杂机械工程问题中工作原理、传动方案、机械结构、控制系统等环节的实验验证。 |
| 4.2 能够针对机电设备的运行、维护等相关的复杂工程问题设计可行的工业现场测试和故障诊断方案，并能在实验方案中考虑冶金行业高温、重载等运行工况。 |
| 4.3 能够根据复杂机械工程问题的研究目标，选用合适的数据分析方法对实验数据进行分析和解读，能够将实验、理论分析等多种技术手段所获得的信息加以综合，得到合理有效的结论。 |
| 5.**使用现代工具：**能够在解决机械电子工程特别是冶金机电系统设计、控制和运行维护等复杂工程问题时合理选择和应用现代设计和控制方法、智能传感检测等现代工具，实现对复杂机械工程问题的预测、模拟及分析，能够理解各种现代工具的局限性。 | 5.1 了解机械电子工程专业常用的信息技术工具、仿真软件等现代工具的使用原理和方法，能够比较各种现代工具优缺点，理解其局限性。 |
| 5.2 能够使用优化分析、可靠性分析及有限元分析等合适的现代设计方法对复杂机械工程问题进行分析、计算、模拟和预测。 |
| 5.3 能够针对具体的机电系统问题开发满足特定需求的专用工具，实现对复杂工程问题的模拟、预测及分析，并能够分析其局限性。 |
| 1. **工程与社会：**能够综合国家发展战略、机械及冶金行业发展规划、法律法规、行业规范等工程背景知识，正确分析、合理评价机械电子工程实践和复杂工程问题解决方案与社会、健康、安全、法律以及文化的相互影响，并理解应承担的责任。
 | 6.1 遵守我国相关法律法规，了解我国机械电子工程特别是冶金自动化装备领域相关的国家战略、产业政策、法律法规以及行业规范。 |
| 6.2 能从机械电子工程实践角度正确分析和评价机电系统特别是冶金行业机械自动化设备设计、制造等技术要求与社会、健康、安全、法律以及文化等非技术制约因素之间的相互影响，理解应承担的责任。 |
| **7.环境和可持续发展：**能够正确理解和客观评价针对机械电子工程特别是冶金行业机械自动化设备领域开发、设计、制造、运行和维护等复杂工程问题的工程实践对环境、社会可持续发展产生的影响。 | 7.1了解我国在环境与可持续发展方面的方针、政策与法规。能够理解环境保护和社会可持续发展的内涵和意义。 |
| 7.2 能够从环境友好和能源消耗等多方面评价机械电子工程，特别是冶金机械自动化设备的复杂工程实践对环境与社会可持续发展的影响。了解能够减少工程实践对环境、社会发展负面影响的专业技术手段。 |
| **8.职业规范：**具有人文社会科学素养和社会责任感，了解并遵守机械电子工程领域开发、设计、制造、运行维护等方面的职业要求和规范，能在工程实践中遵守职业道德和行为规范，履行责任。 | 8.1 能够在机械电子工程领域设计、制造、运行、维护等工程实践中理解并遵守工程职业道德和规范，能够认识并履行自身的责任。 |
| 8.2 具有多角度人文社会科学素养，以及高尚的个人品德和社会责任感。 |
| 9.**个人和团队：**了解机械电子工程领域的跨学科特性及团队合作重要性，具有团队合作精神，能在跨学科团队中履行个人、团队成员与负责人的职责。 | 9.1 了解机械电子工程领域的跨学科特性，理解多学科团队合作对解决复杂机械工程问题的重要性。 |
| 9.2 具有团队合作精神，能够理解各团队成员在机电系统设计、控制、运行维护等工程实践中的作用，能够在机械电子工程实践中履行团队成员、团队负责人的职责。 |
| 10.**沟通：**能够合理选择信息表达方式就具体的机械电子工程实践和复杂工程问题与同行及公众进行有效沟通和交流，具有一定的国际视野，能够用英文进行多文化背景下的沟通和交流。 | 10.1 能够应用机械电子工程专业术语及科学语言撰写内容准确、层次分明、数据翔实的技术方案、技术报告及演示文稿等资料。 |
| 10.2 能够合理选择信息表达方式就机械电子工程实践和复杂工程问题与同行、团队成员及社会公众沟通交流，能够准确表达技术方案、个人观点及指令等，能准确领会他人意见并做出回应。 |
| 10.3 熟练掌握英语，具备一定的国际视野，能够在多文化环境下进行有效沟通与交流，并在沟通与交流过程中考虑文化差异和习俗。 |
| 11.**项目管理：**理解并掌握工程管理原理与经济决策方法，能够在多学科环境中将上述原理和方法应用于机械电子工程领域开发、设计、制造、运行维护等方面。 | 11.1 理解并掌握工程项目管理原理与经济决策方法。了解机电产品设计、制造、设备运行与维护等工程实践中涉及的全周期、全流程的决策过程，理解其中涉及的工程管理和经济决策问题。 |
| 11.2 能够在多学科环境下，针对机电系统设计、制造、检测控制等工程实践合理地应用工程管理原理和经济决策方法。 |
| **12.终身学习：**了解机械电子工程领域的国内外发展动态，具有自主学习和终身学习的意识和能力。 | 12.1了解当前机械电子工程领域的新方向、新理论、新技术等发展状态与发展趋势。 |
| 12.2 理解自主学习与终身学习对个人及社会发展的重要性，具有自主学习和终身学习的意识。了解自主学习的方法与途径，具备学习新事物的能力。 |

**II. Graduation requirements**

1. Engineering knowledge: To solve engineering problems including electrical and mechanical design and manufacturing, product development and production organization and management using mathematical, natural science, mechanical engineering and some knowledge of economy and management.

2. Problem analysis: With the ability of comprehensive application of the theory of science and technical methods for the system expression, the model establishment, analysis, solution and demonstration of electrical and mechanical engineering problems.

3. Plan and develop solution: Master the basic skills of electrical and mechanical engineering including drawing, calculation, experiment, testing and the basic process operation and design the specific mechanical system, mechanical device and automatic control system according to different engineering problems.

4. Applications of modern tools: Master proper techniques, skills and modern engineering tools in electrical and mechanical engineering field, and have the ability of analyzing and solving practical problems, developing new equipment according to different engineering problems.

5. Literature search: have the ability to search and synthesize the professional literature and can collect and analyze the related data according to specific engineering problems.

6. Social responsibility of engineer: have good consciousness of economy, safe, efficiency and service and can assess the influence of related system scheme on social, safe, efficiency and culture based on specific requirements and engineering backgrounds.

7. Environment and sustainable development: have the ability to assess the influence of related mechanical system scheme on environment and sustainable development.

8. Professional ethics and standard: grasp a good knowledge of humanities and social sciences and have a strong sense of social responsibility and professional ethics, and can comply with the professional ethics and standard during electrical and mechanical engineering projects.

9. Team work: have the ability to play a role in the multidisciplinary team and have strong interpersonal skills.

10. Communication: can communicate effectively with industry peers and public in the field of electrical and mechanical engineering, and have certain abilities in international perspective, cross-cultural communication and cooperation.

11. Project management: understand the multidisciplinary background of electrical and mechanical engineering and master the principle and methods of engineering management.

12. Lifelong learning: have a correct understanding of lifelong learning, and can self-study and self-development.

**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 |  |  |  |  |  | √ |
| 毕业要求10 |  |  |  | √ |  | √ |
| 毕业要求11 |  |  |  |  |  | √ |
| 毕业要求12 |  |  |  |  | √ |  |

**三、专业主干课程**

机械制图、机械原理、机械设计、机械制造工艺学、机械工程控制基础、液压传动、机械工程测试技术、机电传动控制、机电一体化系统设计、单片机原理及应用、电液比例控制等。

**III．Core courses**

Mechanical Drawing, Principles of Machinery, Mechanical Design, Mechanical manufacturing Technology, Principles of Control, Hydraulic Transmission, Mechanical Engineering Testing Technology, Mechatronic Transmission Control, Mechanical Electrical Integration System Design, Principle and application of single chip microcomputer and Electro-hydraulic Proportional Control Techniques etc.

**四、基本学制：四年**

**IV. Recommended length of the program：**4 years

**五、授予学位：工学学士**

**V. Degree:** Bachelor of Engineering

学生修满所规定的最低毕业学分，符合武汉科技大学授予学士学位规定，授予工学学士学位。

**六、毕业学分要求：176学分**

|  |  |  |  |
| --- | --- | --- | --- |
| 课程类型 | 学分要求 | 课程类型 | 学分要求 |
| 1、公共课程平台课程 | 48 | 3、专业课程模块 | 43.5 |
| 必修课程 | 44 | 必修课程 | 37.5 |
| 选修课程 | 4 | 选修课程 | 6 |
| 2、学科基础平台课程 | 53.5 |
| 必修课程 | 51.5 | 4、实践教学模块 | 25 |
| 选修课程 | 2 | 5、素质拓展模块 | 6 |

\*通识教育选修课4学分包括：人文社科类1学分、艺术体育类1学分、自然科学类1学分、经济管理类 1学分

**VI. Credits required for graduation：176 credits**

|  |  |  |  |
| --- | --- | --- | --- |
| Type of courses | Academic credits | Type of courses | Academic credits |
| 1.Common Courses | 48 | 3. Specialized Courses | 43.5 |
| Required courses | 44 | Required courses | 37.5 |
| Elective courses | 4 | Elective courses | 6 |
| 2. General disciplinary courses  | 53.5 |
| Required Courses | 51.5 | 4.Practicum and Internship Courses | 25 |
| Elective Courses | 2 | 5.Quality Development Courses | 6 |

**七、学分比例**

**VII. Ratio of Credits**

1. **必修选修学分比例**

**The proportion of compulsory elective credits**

|  |  |  |
| --- | --- | --- |
| 类别 | 学分 | 占总学分比例 |
| 必修 | 164 | 93.2% |
| 选修 | 12 | 6.8 % |

1. **实践教学环节学分比例**

**The Proportion of credits in practice teaching**

|  |  |  |  |
| --- | --- | --- | --- |
| 实践教学环节 | 实验教学学分 | 23 | 30.7 % |
| 实践教学模块 | 25 |
| 素质拓展模块 | 6 |

1. **毕业要求实现矩阵**

**VIII. Graduation Realization Matrix**

课程体系对毕业要求的支撑矩阵表

|  | 毕业要求1 | 毕业要求2 | 毕业要求3 | 毕业要求4 | 毕业要求5 | 毕业要求6 | 毕业要求7 | 毕业要求8 | 毕业要求9 | 毕业要求10 | 毕业要求11 | 毕业要求12 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1.1 | 1.2 | 1.3 | 2.1 | 2.2 | 2.3 | 3.1 | 3.2 | 3.3 | 4.1 | 4.2 | 4.3 | 5.1 | 5.2 | 5.3 | 6.1 | 6.2 | 7.1 | 7.2 | 8.1 | 8.2 | 9.1 | 9.2 | 10.1 | 10.2 | 10.3 | 11.1 | 11.2 | 12.1 | 12.2 |
| 思想道德修养与法律基础 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 中国近现代史纲要 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |
| 马克思主义基本原理 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |
| 毛泽东思想与中国特色社会主义理论体系概论 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |
| 大学生心理健康教育 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |
| 形势与政策 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |
| 公益劳动 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |
| 军事课 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |
| 大学英语 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |
| 职业生涯规划与就业创业指导 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |
| 体育 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |
| 创业学基础 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |
| 大学计算机基础A |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 普通化学 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |  |  |
| 高等数学A | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 大学物理B | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 大学物理实验B |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 理论力学 |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 线性代数 | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 复变函数与积分变换B | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 概率论与数理统计A | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 模拟电子技术 |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 材料力学 |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 数字电子技术 |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 数值仿真与Matlab |  |  |  |  |  |  |  |  |  |  |  |  | **H** | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 工程材料学 |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 机械制图A（一） |  |  |  |  |  |  |  |  |  |  |  |  | M |  |  | **H** |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |
| 机械制图A（二） |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  | **H** |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |
| 机械工程导论 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  | **H** |  |  |  |  |  |  | **H** |  |
| 专业学习与发展研讨课 |  |  |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  | **H** |  |  |  |  |  |
| 机械制造基础 | 　 | 　 | **H** |  |  | 　 | 　 | M | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | **H** | **H** |  |  |  |  |  |  |  |  |  | **H** | 　 |
| 机械原理 |  |  | **H** |  |  | **H** | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 机械原理实验 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | M | 　 | **H** | 　 | 　 | 　 | M | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | **H** | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 热流体工程学 |  | **H** |  |  |  |  |  | M |  |  |  |  | L |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 机械设计 |  |  | **H** |  |  |  |  | M |  |  |  |  |  |  |  | L |  |  |  |  |  |  |  |  |  |  |  |  | L |  |
| 机械工程控制基础 | 　 | 　 | **H** | 　 | 　 |  | 　 | 　 | 　 | M | 　 | M | 　 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 液压传动 | 　 | **H** | 　 | 　 | 　 | 　 | 　 | M | 　 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | M |  |  |  | L |  |
| 液压传动实验 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | L | 　 | **H** | 　 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 机械制造工艺学 | 　 |  |  | 　 | **H** | 　 | **H** | M | 　 | 　 |  |  | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | **H** | 　 |  |  |
| 互换性与测量技术 |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 机械工程测试技术 | 　 | 　 | **H** |  |  |  |  |  |  |  | **H** | **H** | 　 |  |  | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | M | 　 |  |  |  |  |
| 流体力学(双语) |  | M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |
| 单片机原理及应用 |  |  | M |  |  |  | **H** |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 机电一体化系统设计 |  |  | M  |  |  | **H**  |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 电液比例控制技术 |  |  | M |  |  | **H** |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 电路分析基础 |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 电路分析基础实验 |  |  |  |  |  |  |  |  |  | **H** |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 机电测控技术综合实验 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | **H** | **H** | M | 　 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 机电传动控制 | 　 | 　 | 　 | 　 | **H** | 　 | M | M | 　 | 　 | 　 | 　 | 　 | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 工程项目管理 |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** | **H** |  |  |
| 机械测绘 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | **H** |  | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | M | **H** |  |  |  |  |  |  |  |
| 工程训练A | 　 | 　 | 　 | 　 | 　 | 　 | M | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |  | 　 | 　 | 　 | **H** |  |  |  |  |  |  |  |  |  |  |
| 认识实习 | 　 | 　 | 　 |  |  | 　 | 　 | M | 　 | 　 | 　 | 　 | 　 | 　 | 　 |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |  |
| 机械原理课程设计 | 　 | 　 | 　 | 　 | M | 　 | **H** | 　 | 　 | 　 | 　 | M | 　 | M | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | **H** | 　 | 　 | 　 | 　 | 　 |
| 机械设计课程设计 | 　 | 　 | 　 | 　 | **H** |  |  | **H** | **H** |  | 　 | 　 |  |  | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | M | **H** |  |  |  |  |  |
| 机制工艺实习 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | M | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | **H** |  | **H** | **H** |  |  |  |  |  |  |  |  |  |  |
| 机电专业综合课程设计 |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  |
| 生产实习 | 　 | 　 | L | 　 | M | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | **H** |  |  | **H** |  |  |  |  |  |  |  |  |  |  |
| 毕业实习 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  |  |  |  |  |  | **H** |  |
| 毕业设计 |  |  |  | **H** |  |  | **H** |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **H** |  | **H** |  | **H** |  |  |
| 数学建模实践 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | M | 　 | 　 | **H** |  |  |  |  |  |  |  | **H** | **H** |  | **H** |  |  |  |  |
| 液压系统虚拟仿真实验 |  |  |  |  |  |  |  |  |  | **H** |  |  | **H** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 先进制造课程设计 |  |  |  |  | **H** |  |  | **H** |  |  |  | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |  |  |  |  |  |  |  |

注：本支撑矩阵仅列出必修课程对应支撑关系，在实际操作过程中可能由于课程改革而有所变动。

**九、课程修读进程表**

VIIII. Teaching Process Map



**十、教学环节设置及学分分布表**

X. Offered Course and Distribution of Academic Credits

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **课程类型** | **课程性质** | **课程编码** | **课程名称** | **学分** | **合计** | **课内学时** | **实践学时** | **学期** | **先修课程/备注** |
| **讲课** | **实验** | **上机** |
|  平台平台 | 公共课程平台课程 | 公共基础课程 | 必修 | 5105001 | 思想道德修养与法律基础Moral Cultivation and Basics of Law | 3 | 48 | 42 |  |  | 6 | 1 |  |
| 5103001 | 中国近现代史纲要An Outline of Modern and Contemporary History of China | 3 | 48 | 42 |  |  | 6 | 2 |  |
| 5102001 | 马克思主义基本原理Fundamentals of Marxism | 3 | 48 | 44 |  |  | 4 | 3 |  |
| 5101001 | 毛泽东思想与中国特色社会主义理论体系概论Theoretical system of socialism with Chinese characteristics | 5 | 80 | 64 |  |  | 16 | 4 |  |
| 1401840 | 大学英语（一）College English (I) | 3 | 48 | 48 |  |  |  | 1 |  |
| 1401841 | 大学英语（二）College English(II) | 3 | 48 | 48 |  |  |  | 2 |  |
| 1401842 | 大学英语（三）College English (III) | 3 | 48 | 48 |  |  |  | 3 |  |
| 1401843 | 大学英语（四）CollegeEnglish(IV) | 3 | 48 | 48 |  |  |  | 4 |  |
| 1501882 | 体育(一)Physical Education (I) | 1 | 26 | 26 |  |  |  | 1 |  |
| 1501883 | 体育(二)Physical Education (II) | 1 | 34 | 34 |  |  |  | 2 |  |
| 1501884 | 体育(三)Physical Education (III) | 1 | 34 | 34 |  |  |  | 3 |  |
| 1501885 | 体育(四)Physical Education (IV) | 1 | 34 | 34 |  |  |  | 4 |  |
| 5106001 | 形势与政策World Affairs and State Policy | 2 | 32 | 32 |  |  |  | 1-7 | 分散进行 |
| 通识教育课程 | 必修 | 1306001 | 大学计算机基础AIntroduction to Computer Science | 3 | 48 | 30 |  | 18 |  | 1 |  |
| 2501002 | 公益劳动Community Service | 1 | 16 |  |  |  | 16 | 4 |  |
| 2502006 | 大学生心理健康教育Mental Health Education | 2 | 32 | 24 |  |  | 8 | 1 |  |
| 2503001 | 职业生涯规划与就业创业指导Career Planning and Employment Guidance | 1 | 16 | 16 |  |  |  | 2 |  |
| 2504003 | 军事课Military Course | 4 | 148 | 36 |  |  | 112 | 1,2 |  |
| 8001001 | 创业学基础Fundamentals of entrepreneurship | 1 | 16 | 16 |  |  |  | 2 |  |
| 选修 |  | 人文社科类（Humanity and Social Science）、自然科学类（Natural Science）、艺术体育类（Artistic and Sports）与经济管理类（Economic and Management）任选4学分 |
| 学科基础平台课程 | 专业学科基础课程 | 必修 | 0702601 | 高等数学A(一)Advanced Mathematics A (I) | 5 | 80 | 80 |  |  |  | 1 |  |
| 0702602 | 高等数学A(二)Advanced Mathematics A (II) | 6.5 | 104 | 104 |  |  |  | 2 |  |
| 0302603 | 机械制图A (一)Mechanical Drawing A (I) | 3.5 | 56 | 50 |  | 6 |  | 1 |  |
| 0302604 | 机械制图A(二)Mechanical Drawing A (II) | 2.5 | 40 | 32 |  | 8 |  | 2 | 机械制图A(一) |
| 0703605 | 大学物理B(一)College Physics B (I) | 2.5 | 40 | 40 |  |  |  | 2 |  |
| 0703606 | 大学物理B(二)College Physics B (II) | 2 | 32 | 32 |  |  |  | 3 |  |
| 0703607 | 大学物理实验BExperiments in College Physics B  | 1.5 | 24 |  | 24 |  |  | 3 |  |
| 0308027 | 电路分析基础Circuit Analysis Basis | 2.5 | 40 | 40 |  |  |  | 3 | 高等数学A(一) |
| 0308028 | 电路分析基础实验Experiments in Circuit Analysis | 0.5 | 8 |  | 8 |  |  | 3 |  |
| 0702302 | 复变函数与积分变换BComplex Function and Integral Transform(B) | 2 | 32 | 32 |  |  |  | 3 |  |
| 0702026 | 线性代数Linear Algebra | 2 | 32 | 32 |  |  |  | 2 |  |
| 0305026 | 模拟电子技术Analog Electronic Technology | 2.5 | 40 | 32 | 8 |  |  | 3 | 电路分析基础 |
| 0305027 | 数字电子技术Digital Electronic Technology | 2.5 | 40 | 32 | 8 |  |  | 4 | 模拟电子技术 |
| 2206006 | 普通化学General Chemistry | 2 | 32 | 32 |  |  |  | 2 |  |
| 0701017 | 理论力学Theoretical Mechanics | 4.5 | 72 | 72 |  |  |  | 3 | 高等数学 |
| 0701007 | 材料力学Material Mechanics | 5 | 80 | 72 | 8 |  |  | 4 | 理论力学 |
| 0202014 | 工程材料学Engineering Materials | 1.5 | 24 | 20 | 4 |  |  | 3 | 材料力学 |
| 0702303 | 概率论与数理统计AProbability Theory and Mathematical Statistics (A)  | 3 | 48 | 48 |  |  |  | 3 | 高等数学 |
| 选修 | 0307043 | 材料选择及性能Materials Selection and Performance | 1 | 16 | 16 |  |  |  | 4 |  |
| 0304038 | 材料成型设备Materials Molding Equipment | 1 |  |  |  |  |  | 7 |  |
| 0308016 | 智能材料及应用Smart Materials and Applications | 1 |  |  |  |  |  | 4 |  |
| 1306004 | 计算机程序设计基础（C）Basics of Computer Programming (C) | 4 | 64 | 40 |  | 24 |  | 2 |  |
| 1601004 | 信息检索与利用Information Retrieval | 1 | 16 | 16 |  |  |  | 4 |  |
| 0307042 | 机械工程专业英语Mechanical Engineer Specialized English | 1 | 16 | 16 |  |  |  | 6 |  |
| 模块模块模块 | 专业课程模块专业课程模块专业课程模块 | 专业必修课程 | 必修 | 0307034 | 机械工程导论Introduction to Mechanical Engineering | 0.5 | 8 | 8 |  |  |  | 1 |  |
| 0307023 | 专业学习与发展研讨课Seminar on professional learning and development | 0.5 | 8 |  |  |  |  | 1 |  |
| 0309076 | 机械制造基础Basics of Machinofacture | 2 | 32 | 32 |  |  |  | 3 | 机械制图A材料力学 |
| 0304007 | 机械原理Principles of Machinery | 3.5 | 56 | 56 |  |  |  | 4 | 理论力学 |
| 0350002 | 机械原理实验Experiments in Principles of Machinery | 1 | 16 |  | 16 |  |  | 4 | 机械原理理论力学 |
| 0307019 | 热流体工程学Heat Transfer | 1.5 | 24 | 24 |  |  |  | 5 | 高等数学A，工程材料学 |
| 0304001 | 机械设计Mechanical Design | 4 | 64 | 58 | 6 |  |  | 5 | 机械原理材料力学 |
| 0305039 | 机械工程控制基础Principles of Control | 2.5 | 40 | 34 | 6 |  |  | 5 | 高等数学A复变函数 |
| 0305013 | 液压传动Hydraulic Transmission  | 2.5 | 40 | 40 |  |  |  | 5 | 理论力学 |
| 0350003 | 液压传动实验Experiments in Hydraulic Transmission | 1 | 16 |  | 16 |  |  | 5 | 液压传动 |
| 0307002 | 机械工程测试技术Mechanical Engineering Testing Technology | 2 | 32 | 32 |  |  |  | 6 | 高等数学A积分变换 |
| 0305030 | 流体力学(双语)Engineering Fluid Mechanics | 1.5 | 24 | 20 | 4 |  |  | 5 |  |
| 0305059 | 单片机原理及应用Principle and application of single chip microcomputer | 2 | 32 | 26 | 6 |  |  | 6 |  |
| 0305047 | 机电一体化系统设计Mechanical Electrical Integration System Design | 2 | 32 | 32 |  |  |  | 7 |  |
| 0305011 | 数值仿真与MATLABNumerical Simulation and Matlab | 1.5 | 24 | 18 |  | 6 |  | 5 | 机械工程控制基础 |
| 0305002 | 电液比例控制技术Electro-hydraulic Proportional Control Techniques | 2 | 32 | 26 | 6 |  |  | 6 | 液压传动 |
| 0309079 | 机械制造工艺学Mechanical manufacturing Technology | 2 | 32 | 32 |  |  |  | 6 | 机械制造机械设计工程材料学 |
| 0309090 | 互换性与测量技术Interchangeability and technical measurement | 1.5 | 24 | 20 | 4 |  |  | 5 | 机械制造机械设计 |
| 0307020 | 机电传动控制Mechatronic Transmission Control | 2 | 32 | 32 |  |  |  | 6 | 机械工程控制基础 |
| 0350001 | 机电测控技术综合实验Comprehensive experiment of electromechanical measurement and control technology | 1 | 16 |  | 16 |  |  | 6 | 机械工程测试技术，机电传动控制 |
| 0309055 | 工程项目管理Engineering Project Management | 1 | 16 | 16 |  |  |  | 7 |  |
| 专业选修课程 | 选修 | 0305016 | 液压可靠性与故障诊断Hydraulic Reliability and Trouble-shooting | 2 | 32 | 32 |  |  |  | 6 | 液压传动 |
| 0305050 | 可编程控制器原理与应用Principles and Applications of Programmable Control | 2 | 32 | 22 | 10 |  |  | 7 |  |
| 0305042 | 数控技术Numerical Control Technology | 2 | 32 | 22 | 6 | 4 |  | 7 |  |
| 0305010 | 气压传动与控制Pneumatic Transmission and Control | 2 | 32 | 28 | 4 |  |  | 6 | 液压传动 |
| 0305057 | 微机原理及接口技术Microcomputer Principles and Interface Technology | 2 | 32 | 26 | 6 |  |  | 6 |  |
| 0305020 | 液压伺服系统Hydraulic Servo | 2 | 32 | 28 | 4 |  |  | 6 | 液压传动机械工程控制基础 |
| 0305041 | 机器人技术基础Fundamentals of Robot Techniques | 2 | 32 | 32 |  |  |  | 7 |  |
| 0304021 | 机械创新设计Innovative Design of Machinery | 1 | 24 | 16 | 8 |  |  | 7 | 机械原理机械设计 |
| 0307033 | 现代设计方法Modern Design Methods | 2.5 | 40 | 36 |  | 4 |  | 5 | 高等数学A线性代数 |
| 0307055 | 现代制造技术Modern Manufacturing Technology | 1 | 16 | 16 |  |  |  | 7 | 机械原理、机械设计机械制造 |
| 0307049 | 计算机辅助工程及案例分析CAE and Case analysis | 1.5 | 24 | 18 |  | 6 |  | 6 |  |
| 0307058 | 机械系统动力学仿真与分析Dynamics simulation and analysis of mechanical system | 1.5 | 24 | 18 |  | 6 |  | 6 | 机械原理机械设计 |
| 0304055 | Visual C++程序设计方法及其机械工程应用Visual C++ programming method and its application in Mechanical Engineering | 2 | 32 | 26 |  | 6 |  | 5 |  |
| 0307032 | 三维CAD技术3D CAD Technology | 2 | 32 | 24 |  | 8 |  | 5 | 机械制图 |
| 0309087 | 工业互联网技术及应用Industrial Internet technology and application | 1.5 | 24 | 24 |  |  |  | 5 |  |
| 0309091 | 大数据技术原理与应用Principle and application of big data technology | 1.5 | 24 | 24 |  |  |  | 5 |  |
| 0305040 | 摩擦与润滑Friction and Lubrication | 1.5 | 24 | 24 |  |  |  | 6 | 机械设计 |
| 实践教学模块 | 专业实践课程 | 必修 | 0302011 | 机械测绘Mechanical Mapping | 1 | 1周 |  |  |  | 1周 | 2 |  |
| 1701007 | 工程训练AEngineering Training A | 2 | 4周 |  |  |  | 4周 | 2 |  |
| 0305096 | 认识实习Cognition Practice | 1 | 1周 |  |  |  | 1周 | 5 |  |
| 0702101 | 数学建模实践Mathematical Modeling Practice | 1 | 2周 |  |  |  | 2周 | 5 |  |
| 0304008 | 机械原理课程设计Course Project in Principles of Machinery | 1 | 2周 |  |  |  | 2周 | 5 | 机械原理 |
| 0304006 | 机械设计课程设计Course Project in Mechanical Design | 2 | 3周 |  |  |  | 3周 | 6 | 机械设计　 |
| 0305060 | 液压系统虚拟仿真实践Virtual simulation practice of hydraulic system | 1 | 1周 |  |  |  |  | 7 |  |
| 0309071 | 机制工艺实习Internship in Machinofacture Techniques | 2 | 2周 |  |  |  | 2周 | 7 |  |
| 0309096 | 先进制造课程设计Course design of advanced manufacturing | 1 | 2周　 | 　 | 　 | 　 | 2周　 | 6 | 机械制造工艺学 |
| 0305070 | 机电专业综合课程设计Specialized Course Project | 2 | 2周 |  |  |  | 2周 | 7 |  |
| 0305100 | 生产实习Production Practice Experience | 2 | 2周 |  |  |  | 2周 | 7 | 　 |
| 0305097 | 毕业实习Pre-graduation Internship | 1 | 1周 |  |  |  | 1周 | 8 |  |
| 0305098 | 毕业设计(论文)Undergraduate Project | 8 | 16周 |  |  |  | 16周 | 8 |  |
| 素质拓展模块 | 创新创业教育 | 必修 | 创新创业实践3学分Innovation Practices 3 Academic Credits |
| 第二课程 | 第二课堂3学分Second Classroom 3 Academic Credits |

**十一、教学进程安排表**

**XI. Schedule of teaching process**

|  |  |
| --- | --- |
| 学期 | 周 次 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 1 | ♀ | ♀ | ⊙/★ | ★ | ★ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | ● |  | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 2 | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | Ε | ● |  | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 3 | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | ● |  |  | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 4 | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | ● |  | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 5 | □ | □ | □ | □ | ╬ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | × | × | ● |  |  | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 6 | × | × | × | □ | □ | □ | □ | □ | Ε | Ε | □ | □ | □ | □ | □ | □ | □ | □ | ● |  | 　 | 　 | 　 | 　 | 　 | 　 | 　 | 　 |
| 7 | □ | □ | ∕ | ∕ | ∕ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | × | ×/E | ● |  |  |  |  |  |  |  |  |  |
| 8 | ＃ | ＃ | ※ | ※ | ※ | ※ | ※ | ※ | ※ | ※ | ※ | ※ | ※ | ※ | ※ | ※ | ※ | ┼ | √ |  |  |  |  |  |  |  |  |  |

符号说明：

1、♀ 入学前机动 2、⊙ 入学教育 3、★ 军训 4、□理论教学 5、√ 机动时间 6、●考试 7、×课程设计 8、Ε专业实验或实习 9、—假期

10、▲ 学年论文 11、Ｇ技能训练 12、※ 毕业设计（论文） 13、┼毕业鉴定 14、＃毕业实习 15、Ｓ写生 16、∕ 生产实习(金工实习)

17、Τ教材教法 18、☆ 教育实习 19、○技能教育实习 20、◎ 专题讲座 21、◆ 公益劳动 22、△ 社会调查 23、╬ 认识实习