



中南民族大学
SOUTH-CENTRAL MINZU UNIVERSITY

适用于生物医学工程学院2025级本科生

生物医学工程学院 本科专业人才培养方案 (医学信息工程专业)

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生物医学工程学院简介

生物医学工程学院成立于 2009 年，前身可追溯至上世纪八十年代初期成立的生物磁学研究所。经过三十多年的建设，生物医学工程学科建成为国家民委重点学科，培养了大量的本科生、研究生，其中 65%以上来自少数民族地区，为民族地区社会经济发展做出了重要贡献。

通过长期的建设，学院形成了符合生物医学工程学科特点——“交叉性和综合性”的师资队伍。现有来自于 7 个不同一级学科的专任教师 39 名，其中教授 10 人，副教授 13 人，硕士生导师 30 人，专任教师中 95%具有博士学位。入选“湖北省名师工作室”1 个、中科院“百人计划”1 人、湖北省“百人计划”1 人、楚天英才计划 1 人、国家民委中青年英才计划 2 人、湖北省优秀青年骨干计划 1 人、“3551”光谷创业人才计划 1 人。设有生物医学基础部、医疗电子系和医学信息系 3 个系部，1 个实践教学与创新活动中心。

学院有生物医学工程、医学信息工程 and 智能医学工程 3 个本科专业，1 个生物医学工程一级学科硕士点（含工学、理学），在校本科生近 1200 人，硕士研究生 200 余人。生物医学工程专业为国家级一流专业建设点、省级品牌专业，并入选省级“战略性新兴产业”培养计划和“荆楚卓越工程师”培养计划，医学信息工程为省级一流专业建设点。学院现有湖北省生物医学工程虚拟仿真实验中心、湖北省服务外包人才培养（训）基地，以及医学传感器、生物医学信号检测、医疗仪器、虚拟仪器、课程设计、学生创新设计等专业实验室；建有东湖高新区高科医疗器械园、湖北省肿瘤医院、解放军中部战区总医院等实践教学基地。学院与东湖高新区高科医疗器械园合作培养卓越工程人才，与美国佛罗里达理工大学合作，按“2+2”模式培养国际创新人才。近 5 年来，学院学生在“全国大学生生物医学电子创新设计竞赛”、“全国大学生电子竞赛”、“全国大学生数学建模竞赛”、“蓝桥杯全国计算机软件大赛”等学科竞赛中获国家级、省（部）级奖励 200 余项；获得国家级和省级大学生创新科研项目立项 10 余项。

学院现有医学信息处理与肿瘤诊疗湖北省重点实验室和认知科学国家民委重点实验室 2 个省部级重点实验室；形成了膜离子通道结构、功能及生理建模、生物医学信号检测与处理、视觉认知计算与医学图像处理、生物医学传感与仪器

等 4 个具有学科特色的研究方向。实验室购置了 128 导脑功能成像系统、激光共聚焦显微镜、双通道膜片钳系统等先进设备。

学院以神经工程为核心，从微观到宏观，从分子、细胞和整体水平，探索神经系统活动的基本规律。在离子通道功能和神经递质释放、脑电和肌电信息检测与解析、医学成像和医学图像处理、医学人工智能、生物医学传感与医学仪器等方面的研究上形成了自己的特色。先后承担国家自然科学基金重大研究计划项目、面上项目、青年项目，以及省部级项目 60 余项，在国内外重要学术期刊上发表 SCI、EI 收录学术论文 160 余篇，获专利授权和软件著作权 80 余项，获省部级奖励 3 项。

学院秉承“医工融合、志惠民生”的办学理念，致力于学生创新能力和自我素质的提高，以学风院风建设为重点，通过完善课程体系，革新教学内容，强化工程实践，充分调动学生学习的积极性、主动性和创造性，提高了人才培养质量。多年来，学院就业率和就业质量稳居学校前列，连续 3 年被评为学校就业标兵单位，本科生升学率连续 3 年超过 35%。

Introduction to the College of Biomedical Engineering

The College of Biomedical Engineering was established in 2009, with its origins tracing back to the Institute of Biomagnetics founded in the early 1980s. After over three decades of development, the discipline of Biomedical Engineering has grown into a key discipline under the State Ethnic Affairs Commission. The college has cultivated a large number of undergraduate and graduate students, over 65% of whom come from ethnic minority regions, making significant contributions to the socioeconomic development of these areas.

Through long-term development, the college has built a faculty team that reflects the interdisciplinary and comprehensive nature of Biomedical Engineering. Currently, there are 39 full-time faculty members from seven different primary disciplines, including 10 professors, 13 associate professors, and 30 master's supervisors. Among them, 95% hold doctoral degrees. The faculty includes one "Hubei Provincial Famous Teacher Studio," one member of the Chinese Academy of Sciences' "Hundred Talents

Program," one member of Hubei Province's "Hundred Talents Program," one member of the "Chutian Scholar Program," two members of the State Ethnic Affairs Commission's "Young and Middle-Aged Talents Program," one member of Hubei Province's "Outstanding Young Backbone Program," and one member of the "3551 Optics Valley Entrepreneurship Talent Program." The college consists of three departments: the Department of Biomedical Fundamentals, the Department of Medical Electronics, and the Department of Medical Information Engineering, as well as a Practical Teaching and Innovation Center.

The college offers three undergraduate programs—Biomedical Engineering, Intelligent Medical Engineering, and Medical Information Engineering—and one master's program in Biomedical Engineering (covering both engineering and science disciplines). It currently enrolls nearly 1,200 undergraduate students and over 200 graduate students. The Biomedical Engineering program is a national first-class undergraduate program and a provincial brand program, selected for the provincial "Strategic Emerging Industries" training plan and the "Jingchu Outstanding Engineer" training plan. The Medical Information Engineering program is a provincial first-class undergraduate program. The college houses the Hubei Provincial Virtual Simulation Experimental Center for Biomedical Engineering and the Hubei Provincial Service Outsourcing Talent Training Base, along with specialized laboratories for medical sensors, biomedical signal detection, medical instruments, virtual instruments, course design, and student innovation projects. It has established practical training bases in the East Lake High-Tech Development Zone Medical Device Park, Hubei Cancer Hospital, and the Central Theater General Hospital of the PLA. The college collaborates with the East Lake High-Tech Medical Device Park to cultivate outstanding engineering talents and partners with the Florida Institute of Technology in the U.S. to train international innovative talents under a "2+2" dual-degree program. Over the past five years, students have won over 200 national and provincial awards in competitions such as the National Biomedical Electronic Innovation Design Competition, the National Electronic Design Contest, the National Mathematical Modeling Contest, and the "Blue Bridge Cup" National Software and Information

Technology Competition. Additionally, they have secured more than 10 national and provincial-level innovation research projects.

The college has two provincial and ministerial-level key laboratories: the Hubei Provincial Key Laboratory of Medical Information Processing and Tumor Diagnosis & Treatment, and the State Ethnic Affairs Commission Key Laboratory of Cognitive Science. It has developed four distinctive research directions: structure, function, and physiological modeling of membrane ion channels; biomedical signal detection and processing; visual cognitive computing and medical image processing; and biomedical sensors and instruments. The laboratories are equipped with advanced instruments such as a 128-channel brain imaging system, a laser confocal microscope, and a dual-channel patch-clamp system.

With a focus on neural engineering, the college explores the fundamental mechanisms of neural system activity from microscopic to macroscopic levels, encompassing molecular, cellular, and holistic perspectives. It has established research strengths in ion channel function and neurotransmitter release, EEG and EMG signal detection and analysis, medical imaging and image processing, medical artificial intelligence, and biomedical sensors and instruments. The college has undertaken over 60 national and provincial research projects, including major research initiatives, general projects, and youth projects under the National Natural Science Foundation of China. Faculty members have published more than 160 SCI/EI-indexed papers in prestigious academic journals, obtained over 80 patents and software copyrights, and received three provincial and ministerial-level awards.

Adhering to the educational philosophy of "Integrating Medicine and Engineering, Serving the People's Well-being," the college is committed to enhancing students' innovation capabilities and self-development. Emphasizing academic excellence and a positive learning environment, it continuously refines its curriculum, updates teaching content, and strengthens engineering practice to fully mobilize students' enthusiasm, initiative, and creativity, thereby improving the quality of talent cultivation. Over the years, the college has maintained a leading position in employment rates and job quality within the university, being recognized as an

"Employment Model Unit" for three consecutive years. The undergraduate enrollment rate for further studies has exceeded 35% for three years running.

专业简介

医学信息工程专业

医学信息工程是一门以信息科学和现代医学为主的多学科交叉与融合的新兴综合性学科；是计算机、信息技术、通信技术、医学仪器以及生物学等在现代医学、医疗卫生管理中的应用与融合。主要学习基础医学、计算机技术、生物医学信息处理、电子技术和软件工程等学科基础理论和基本知识。重视计算机技术、信息处理技术在医疗卫生系统中应用的基本训练，培养能在医学信息工程、医学信息处理、医学信息系统等领域及其它软件工程产业从事研究、开发、教学及管理的高级技术人才。本科，学制四年，招理科生，毕业生授予工学学士学位。

Program Introduction

Medical Information Engineering Program

Medical Information Engineering is an emerging interdisciplinary field that combines information science, modern medicine, computer science, information technology, communication technology, medical instrumentation, and biology for applications in healthcare and medical management. The curriculum covers foundational theories in basic medicine, computer technology, biomedical information processing, electronics, and software engineering. Students are trained in applying computer and information processing technologies to medical and healthcare systems. The program prepares high-level technical professionals for research, development, teaching, and management in medical information engineering, medical data processing, medical information systems, and related software engineering industries.

Degree: Bachelor of Engineering

Duration: 4 years

Admission: Science students

医学信息工程专业本科人才培养方案

Undergraduate Program for Medical Information Engineering

一、培养规格

I Cultivation Standards

I) 学制

Length of Schooling

修业年限：4 年

Duration: four years

II) 学位

Degree

授予学位：工学学士学位

Degrees conferred: Bachelor of Engineering

二、培养目标

II Cultivation Objectives

医学信息工程培养目标：面向“健康中国”国家战略和大健康产业发展需求，铸牢中华民族共同体意识，培养掌握生物医学基础、工程基础和电子技术、信息技术专业知识，具备工程开发能力、创新创业意识和能力，具有家国情怀、中华民族共同体意识、人文关怀意识、大健康观和国际视野的高素质复合型人才。学生毕业后能从事医学信息工程领域相关教育、科研、开发、管理与服务工作，能解决生命健康领域的复杂工程问题。

毕业生应掌握现代医学、生命科学、工程科学等基础理论和生物医学电子学、医学信号处理、人工智能与大数据分析、医学信息系统开发等专业知识，并综合应用于医院信息管理、AI 医学影像分析、医疗物联网与智慧医疗等领域。具备扎实的工程实践能力、批判性思维、探索精神和创新意识，以及自主学习与终身学习能力。同时，毕业生应具备较强的沟通交流能力和团

队合作精神，能够在多学科、多文化背景的团队中发挥重要作用，解决医学信息工程领域的复杂工程问题。

Training Objectives of Medical Information Engineering: Aiming at the national strategy of "Healthy China" and the development needs of the big health industry, this major aims to cultivate high-quality interdisciplinary talents who master the basic knowledge of biomedicine, engineering fundamentals, electronic technology, and information technology. These talents should possess engineering development capabilities, as well as the awareness and abilities of innovation and entrepreneurship. They should also have a sense of national and family responsibility, the consciousness of the Chinese nation community, the awareness of humanistic care, a broad concept of health, and an international perspective. After graduation, students can engage in education, scientific research, development, management, and service work related to the field of medical information engineering, and are able to solve complex engineering problems in the field of life and health.

Graduates should master the basic theories of modern medicine, life sciences, engineering sciences, etc., as well as professional knowledge such as biomedical electronics, medical signal processing, artificial intelligence and big data analysis, and the development of medical information systems. They should be able to comprehensively apply this knowledge in fields such as hospital information management, AI-based medical image analysis, medical Internet of Things, and smart healthcare. Graduates should have solid engineering practice abilities, critical thinking, a spirit of exploration, and innovation awareness, as well as the abilities of independent learning and lifelong learning. At the same time, graduates should possess strong communication skills and a spirit of teamwork, and be able to play an important role in teams with multi-disciplinary and multi-cultural backgrounds, and solve complex engineering problems in the field of medical information engineering.

毕业五年左右在从业的专业领域达到以下目标要求：

1（人文素养）： 具有良好的人文科学素养、工程职业道德和社会责任感，在工程实践中充分考虑社会、健康、安全、法律及文化的影响，履行工程师责任，铸牢中华民族共同体意识，能为国家、区域和民族地区的健康事业服务；

2（专业知识）： 在解决医学信息工程及相关领域复杂工程问题时，能够基于数学、自然科学原理，应用医学信息工程专业知识、工程技能和现代工具，针对问题进行分析和研究，并设计出可行的解决方案；

3（工程能力）： 在医学信息工程及相关领域的工程项目中，具有技术开发、工程实践、组织管理与决策能力，并能够考虑自然、社会伦理和可持续发展等因素，成为技术中坚、业务骨干或组织领导者；

4（沟通协作）： 具备良好的沟通、表达能力和国际视野，能在多民族、多学科、跨文化环境和团队中发挥作用；

5（发展潜能）： 具有终身学习和自主学习的意识，能跟踪医学信息工程领域的最新理论、技术及前沿动态，具备不断适应社会发展和行业竞争的能力。

The Biomedical Engineering program aims to meet the national strategic needs of "Healthy China" and the talent demands of the health industry. It focuses on cultivating high-quality, versatile professionals who possess a solid foundation in biomedical sciences, engineering principles, and expertise in electronic and information technologies. Graduates will be equipped with engineering development capabilities, innovative and entrepreneurial awareness, and a sense of social responsibility, national identity, community consciousness, humanistic care, a holistic health perspective, and international vision. Upon graduation, students will be capable of engaging in education, research, development, management, and service-related work in the field of biomedical engineering, and will be able to address complex engineering challenges in life and health sciences.

Graduates are expected to master fundamental theories in modern medicine, life sciences, and engineering sciences, as well as specialized knowledge in biomedical electronics, medical signal processing, medical imaging technology, and biomaterials

and device development. They will apply this knowledge comprehensively in areas such as medical device development, medical image analysis, biomaterial design, and rehabilitation engineering. Additionally, graduates will possess strong engineering practical skills, critical thinking, exploratory spirit, innovative awareness, and the ability for self-directed and lifelong learning. They will also demonstrate effective communication and teamwork skills, enabling them to play significant roles in multidisciplinary and multicultural teams to solve complex engineering problems in biomedical engineering.

Expected Achievements within 5 Years after Graduation:

1 (Humanistic Qualities): Graduates will foster a strong sense of the Chinese national community, exhibit a high level of social responsibility and professional ethics, and demonstrate sound humanistic and scientific literacy, as well as engineering and medical ethics. They will consider the impacts of social, health, safety, legal, and cultural factors in engineering practices, fulfill their responsibilities as engineers, and contribute to the health initiatives of the nation, regions, and ethnic areas.

2 (Professional Knowledge): When addressing complex engineering problems in biomedical engineering and related fields, graduates will be able to apply mathematical and natural science principles, utilize biomedical engineering expertise, electronic and computer technologies, and modern engineering tools to analyze and research engineering challenges in areas such as medical device development, medical signal processing, medical imaging technology, and biomaterial design, and propose viable solutions.

3 (Engineering Competence): Graduates will possess the ability to conduct research, development, and management in areas such as medical device design and development, medical signal processing and analysis, medical imaging system optimization, and biomaterials and device development. They will be capable of solving practical problems in biomedical engineering and demonstrate interdisciplinary collaboration skills.

4 (Communication and Collaboration): Graduates will exhibit excellent communication and teamwork skills, enabling them to contribute effectively in multicultural, multidisciplinary, and cross-cultural environments and teams.

5 (Development Potential): Graduates will have the ability for lifelong learning and rapid self-improvement, enabling them to stay abreast of the latest theories, technologies, and advancements in biomedical engineering and adapt to the rapid development of science, technology, and society.

三、毕业要求

III Basic Requirements for Graduation

1、工程知识：能够将数学、自然科学、医学和工程基础等专业知识用于解决生物医学工程领域的复杂工程问题，包括医疗设备开发、医学信号处理、医学成像技术和生物材料设计等。

2、问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达并通过文献研究分析医疗设备开发、医学信号处理、医学成像系统优化、生物材料与器械研发等过程中出现的复杂工程问题，综合考虑可持续发展的要求，以获得有效结论。

3、设计/开发解决方案：能够设计针对生物医学工程领域复杂工程问题的解决方案，开发满足特定需求的医疗设备、医学影像系统或康复工程产品，体现创新性，并从健康、安全、环境、全生命周期成本、法律与伦理、社会与文化等角度考虑可行性。

4、研究：能够基于科学原理并采用科学方法对生物医学工程领域复杂工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

5、使用现代工具：能够针对生物医学工程领域复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复杂工程问题的预测与模拟，并能够理解其局限性。

6、工程与可持续发展：在解决生物医学工程领域相关复杂工程问题时，能够基于相关背景知识，分析和评价工程实践对健康、安全、环境、法律以及经济和社会可持续发展的影响，并理解应承担的责任。

7、工程伦理和职业规范：有工程报国、为民造福的意识，具有人文社会科学素养和社会责任感，能够理解和践行工程伦理，在工程实践中遵守工程职业道德、规范和相关法律，履行责任。

8、个人和团队：能够在多样化、多学科背景下的团队中承担个体、团队成员以及负责人的角色。

9、沟通：能够就生物医学工程领域的复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令；能够在跨文化背景下进行沟通和交流，理解、尊重语言和文化差异。

10、项目管理：理解并掌握与工程项目相关的管理原理与经济决策方法，并能在多学科环境中应用。

11、终身学习：具有自主学习、终身学习和批判性思维的意识 and 能力，能够理解广泛的技术变革对工程和社会的影响，适应新技术变革。

Students should acquire knowledge in biology, medicine, electronic technology, and computer science. Building on the study of biomedical electronics, medical signal processing, medical imaging technology, and biomaterials and device development, they should be able to integrate multiple skills to address complex engineering problems in medicine, develop effective medical devices, medical imaging systems, or rehabilitation engineering solutions, and contribute to improving the efficiency and quality of healthcare services, thereby enhancing human capabilities in the medical field. Graduates should possess the following knowledge, abilities, and qualities:

1、Engineering Knowledge: Ability to apply mathematics, natural sciences, medicine, and engineering fundamentals to solve complex engineering problems in biomedical engineering, including medical device development, medical signal processing, medical imaging technology, and biomaterial design.

2、Problem Analysis: Ability to identify, formulate, and analyze complex engineering problems in medical device development, medical signal processing,

medical imaging system optimization, and biomaterials and device development using principles of mathematics, natural sciences, and engineering sciences. This includes considering sustainable development requirements to draw valid conclusions.

3 、 Design/Development of Solutions: Ability to design solutions for complex engineering problems in biomedical engineering, develop medical devices, medical imaging systems, or rehabilitation engineering products that meet specific needs, demonstrate innovation, and consider feasibility from the perspectives of health, safety, environment, lifecycle cost, legal and ethical issues, and social and cultural factors.

4 、 Research: Ability to conduct research on complex engineering problems in biomedical engineering based on scientific principles and methods, including designing experiments, analyzing and interpreting data, and synthesizing information to draw reasonable and effective conclusions.

5 、 Use of Modern Tools: Ability to develop, select, and apply appropriate techniques, resources, modern engineering tools, and information technology tools for complex engineering problems in biomedical engineering, including prediction and simulation, while understanding their limitations.

6、 Engineering and Sustainable Development: Ability to analyze and evaluate the impact of engineering practices on health, safety, environment, legal, economic, and social sustainable development when addressing complex engineering problems in biomedical engineering, and to understand the associated responsibilities.

7 、 Engineering Ethics and Professional Standards: Possess a sense of contributing to the nation and society through engineering, demonstrate humanistic and social science literacy, and uphold social responsibility. Ability to understand and practice engineering ethics, adhere to professional standards and relevant laws in engineering practice, and fulfill responsibilities.

8 、 Individual and Teamwork: Ability to function effectively as an individual, team member, or leader in diverse, multidisciplinary teams.

9、 Communication: Ability to communicate effectively with industry peers and the public on complex engineering problems in biomedical engineering, including

writing reports and design documents, delivering presentations, and expressing or responding to instructions clearly. Ability to communicate and collaborate in cross-cultural contexts, understanding and respecting linguistic and cultural differences.

10、Project Management: Understand and apply management principles and economic decision-making methods related to engineering projects, and utilize them in multidisciplinary environments.

11、Lifelong Learning: Possess the awareness and ability for self-directed learning, lifelong learning, and critical thinking. Ability to understand the impact of technological changes on engineering and society and adapt to new technological advancements.

四、毕业要求与培养目标对应矩阵

IV Matrices of Graduation Requirements and Cultivation Objectives

培养目标及毕业要求 Cultivation Objectives & Graduation Requirements	1 (人文素养) Humanistic Qualities	2 (专业知识) Professional Knowledge	3 (工程能力) Engineering Competence	4 (沟通协作) Communication and Collaboration	5 (发展潜能) Development Potential
毕业要求 1/工程知识 Graduation Requirement I		√			√
毕业要求 2/问题分析 Graduation Requirement II		√			
毕业要求 3/开发解决方案 Graduation Requirement III		√	√	√	
毕业要求 4 研究 Graduation Requirement IV		√	√		
毕业要求 5 使用现代工具 Graduation Requirement V			√		√
毕业要求 6 Graduation Requirement VII	√		√		
毕业要求 7 工程伦理和职业规范 Graduation Requirement VIII	√				
毕业要求 8 个人和团队 Graduation Requirement IX				√	
毕业要求 9 沟通 Graduation Requirement X				√	
毕业要求 10 项目管理 Graduation Requirement XI			√	√	√
毕业要求 11 终身学习 Graduation Requirement XII					√

五、毕业要求实现矩阵

V Matrices of Realization of Graduation Requirements

课程及毕业要求 Course & Graduation Requirements	毕业要求										
	1 工程知识 Engineering Knowledge	2 问题分析 Problem Analysis	3 设计开发/解决方案 Design/Development Solutions	4 研究 Research	5 使用现代工 具 Using Modern Tools	6 工程与可持 续发展 Engineering and Sustainable Development	7 工程伦理与职业规 范 Engineering ethics and Professional norms	8 个人和团队 Individual and Team	9 沟通 Communication	10 项目管理 Project Management	11 终身学习 Lifelong Learning
思想道德与法治 Moral Education and Rule of Law							H				
中国近现代史纲要 Essentials of China Modern and Contemporary History							M				
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 Socialist Theoretical System with Chinese Characteristics							M				
马克思主义基本原理 Basis Principles of Maxism							M				
习近平新时代中国特色社会主义思想概论 Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era											H
形势与政策 Situation and Policy											H
英语 English									H		
劳动教育 Labor Education								H			
大学英语扩展课程 University English Extension Program								H			
中华民族共同体概论 Education of Chinese Minzu Community Consciousness						L			H		
就业指导 Employment Guidance						M	H				L

课程及毕业要求 Course & Graduation Requirements	毕业要求										
	1 工程知识 Engineering Knowledge	2 问题分析 Problem Analysis	3 设计开发/解决方案 Design/Development Solutions	4 研究 Research	5 使用现代工 具 Using Modern Tools	6 工程与可持 续发展 Engineering and Sustainable Development	7 工程伦理与职业规 范 Engineering ethics and Professional norms	8 个人和团队 Individual and Team	9 沟通 Communication	10 项目管理 Project Management	11 终身学习 Lifelong Learning
工程项目管理与经济决策 Engineering Project Management and Economic Decision Analysis						M		M		H	
军事技能训练 Military Skill Training							L	M			
工程制图 Engineering Drafting					L						
线性代数 Linear Algebra	M										
高等数学 Advanced Mathematics	H										
复变函数 (B) Complex Function (B)	L										
概率论与数理统计 Probability Theory and Mathematic Statistics	M										
电路分析 Circuit Analysis	H	M									
大学物理 College Physics	H										
大学物理实验 College Physics Experiments				M							
生物医学工程前沿 Frontiers in Biomedical Engineering											H
人工智能与 Python 程序设计 Artificial Intelligence and Python Programming	L				H						
模拟电子技术实验 Analog Electronic Experiment		M	L		M						
模拟电子技术 Analog Electronic Technology	M	H									
信号与系统 Signal and System	M	H		H							
数字电子技术与 EDA 实验 Digital Electronic Technology and EDA Experiment		M	L		M						

课程及毕业要求 Course & Graduation Requirements	毕业要求										
	1 工程知识 Engineering Knowledge	2 问题分析 Problem Analysis	3 设计开发/解决方案 Design/Development Solutions	4 研究 Research	5 使用现代工 具 Using Modern Tools	6 工程与可持 续发展 Engineering and Sustainable Development	7 工程伦理与职业规 范 Engineering ethics and Professional norms	8 个人和团队 Individual and Team	9 沟通 Communication	10 项目管理 Project Management	11 终身学习 Lifelong Learning
数字电子技术与 EDA Digital Electronic Technology and EDAy	M	H			M						
C++程序设计			M								
数据结构与算法分析 Data Structures and Algorithm Analysis	H		M								
数据库原理 Database Principle	H				M						
解剖生理学实验 Anatomy and Physiology Experiment		M					M		L		
解剖生理学 Anatomy and Physiology		M		M			H				
人工智能数学基础	H										
生物医学数字信号处理 Biomedical Digital Signal Processing	M	H		H							
医学大数据分析 Big Data Analytics for Healthcare	M			M	M						
医学图像处理与深度学习 Medical Image Processing and Deep Learnin	M			M	M						
医学信息系统 Medical Information System			H	M	M						
医学大数据分析课程设计 Medical Big Data Analysis Course Design		M	H		M				M		
医学信息程序课程设计 Project of Medical information Software Technique Design		M	H		M				M		
医学信息系统课程设计 Medical Information System Design		M	H		M			H	M		
电子实训		H						M	L		

课程及毕业要求 Course & Graduation Requirements	毕业要求										
	1 工程知识 Engineering Knowledge	2 问题分析 Problem Analysis	3 设计开发/解决方案 Design/Development Solutions	4 研究 Research	5 使用现代工具 Using Modern Tools	6 工程与可持续发展 Engineering and Sustainable Development	7 工程伦理与职业规范 Engineering ethics and Professional norms	8 个人和团队 Individual and Team	9 沟通 Communication	10 项目管理 Project Management	11 终身学习 Lifelong Learning
Electronics Training											
工程训练 A Engineering Training A			M			M		M			
毕业实习 Practice of Graduation Design					M				M		M
毕业论文(设计) Undergraduate Thesis (Project)		H	H	H	M		M	L	M	L	H

注①不同学期的同一门课程只需填写一次；

②所有的课程和教学活动都要列入表格，包括集中实践性环节；③表格要清晰展示每门课程与“毕业要求”中每项具体要求达成的关联度情况，关联度强的用“H”表示，关联度中等的用“M”表示，关联度弱的用“L”表示。

六、核心课程

VI Core Courses

解剖生理学 Anatomy and Physiology、信号与系统 Signal and System、数字电子技术 Digital Electronic Technology、生物医学数字信号处理 Biomedical Digital Signal Processing、人工智能数学基础 Mathematical Foundations of Artificial Intelligence、数据库原理 Database System、数据结构与算法分析 Data Structures and Algorithm Analysis、医学大数据分析 Big Data Analytics for Healthcare、医学图像处理与深度学习 Medical Image Processing and Deep Learning、医学信息系统 Medical Information System、软件工程 Software Engineering。

七、主要实践性教学环节

VII Main Internship and Practical Training

解剖生理学实验 Anatomy and Physiology Experiment、电子实训 Electrical Engineering Practice、医学信息程序课程设计 Project of Medical information Software Technique Design、医学信息系统课程设计 Medical Information System Design、医学大数据分析课程设计 Medical Big Data Analytics Course Design、创新创业活动 Innovation and Entrepreneurship、毕业实习 Practice of Graduation、毕业论文（设计） Graduation Thesis (Project)

八、学时与学分

VIII Hours/Credits

学时学分构成表

Table of Hours and Credits

课程类别 Course Classified			学时/周数 Period/Weeks	学分 Credits		学分比例 Proportion of Crs.	
				理论 Theory	实验（实践） Practice (I&E Crs.)		
通识课程平台 General Course Platform		必修 Compulsory	512	26	3	19.3%	
		选修 Elective	112	7	/	4.7%	
学科基础课程平台 Basic Course Platform		必修 Compulsory	672	35.5	4.5	26.7%	
专业课程平台 Major Course Platform		必修 Compulsory	316	13	4.5	11.67%	
		选修 Elective	428	20	4.5	16.33%	
集中性实践课程平台 Practical Teaching Platform		必修 Compulsory	24W	/	24	17.3%	
		选修 Elective	0	/	0		
素质拓展 平台 Quality Development Platform	双创学分 Innovation & Entrepreneursh ip Credits	/ 4	32	2	/	2.67%	
	其他学分 Other Credits		80+1W	5	1	4%	
小计 Amount	必修学分总数 Compulsory Credits		120.5	选修学分总数 Elective Credits	29.5	选修学分比例 Proportion of Elective Credits	19.6%
	理论学分总数 Theory Credits		108.5	实践学分总数 Practice Credits	41.5	实践教学环节比例 Proportion of Internship and Practical Training	27.6%

课程类别 Course Classified	学时/周数 Period/Weeks	学分 Credits		学分比例 Proportion of Crs.
		理论 Theory	实验（实践） Practice (I&E Crs.)	
最低毕业学分 The Lowest Graduate Credits	150			

注：①学分比例：各教学平台或教学环节占最低毕业学分的比例。

②实践教学环节，包括集中性实践教学环节和实验教学（不含体育）。集中性实践教学环节，包括培养方案内集中实施的实践、实习、课程设计、毕业设计、毕业论文、社会调查等；实验教学，包括课内实验和独立开设实验。

③必修学分总数=通必学分+学科基础学分+专必学分+实践必修学分+素质拓展学分；

选修学分总数=通选学分+专选学分+实践（选修）学分；

理论学分总数=所有平台理论学分之和（不包括双创学分）；

实践学分总数=所有平台实践学分之和（不包括双创学分）；

最低毕业学分=必修学分+选修学分=理论学分+实践学分+双创学分。

九、教学进程计划表

IX Teaching Schedule Form

表一：通识课程平台 / Form I: General Course Platform

表一（A）：通识必修课程/Form I (A):General Compulsory Courses (General Required)

课程编号 Course Code	课程名称 Course Name	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester
				理论 The.	实验 Exp.	实践 Pra.	习题 Ueb	
20W100000613	英语 1 English 1	2	32	32				1
218110000313	体育 1 Physical Education 1	0/1	26			26		1
217100014918	思想道德与法治 Moral Education and Rule of Law	2.5/0.5	52	40		12		2
217100015218	形势与政策 Situation and Policy	2	32	32				1-8
225100000118	中华民族共同体概论 The Introduction to Community for the Chinese Nation	1.5/0.5	36	24		12		2
20W100000713	英语 2 English 2	2	32	32				2
218110000213	体育 2 Physical Education 2	0/1	32			32		2
2171000122	中国近现代史纲要 Essentials of China Modern and Contemporary History	2.5/0.5	52	40		12		1
20W100002623	跨文化交际 Intercultural Communication	2	32	32				3/4
20W100002523	中外文化比较 Comparison of Chinese and Western Cultures	2	32	32				3/4
20W100001618	中华文化导论（英文） Introduction to Chinese Culture	2	32	32				3/4
20W100001518	英语国家社会与文化 Society and Culture of English Speaking Countries	2	32	32				3/4
20W100001318	高级媒体英语视听说 Advanced Media English: Watching, Listening and Speaking	2	32	32				3/4
20W100001018	学术英语阅读与写作 Academic Reading and Writing	2	32	32				3/4
218110015018	体育 3 Physical Education 3	0/0.5	16			16		3
217100012318	马克思主义基本原理	2.5/0.5	52	40		12		4

	Basis Principles of Maxism							
217100015818	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 Socialist Theoretical System with Chinese Characteristics	2.5/0.5	52	40		12		3
217100015918	习近平新时代中国特色社会主义思想概论 Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	2.5/0.5	52	40		12		5
218110014718	体育 4 Physical Education 4	0/0.5	16			16		4
218110014018	体育 5 Physical Education 5	0/0.5	16			16		5
218110015318	体育 6 Physical Education 6	0/0.5	16			16		6
学分要求：必修学分 29 Demand of Credits: Required 29								

注：大学英语扩展课程包括学术英语阅读与写作、高级媒体英语视听说、英语国家社会与文化、中华文化导论（英文）、跨文化交际（英文）、中外文化比较，要求在第 3,4 学期完成 2 学分即可。

表一（B）：通识选修课程（通选课）/Form I (B): General Elective Courses

模块 Module	学分 Crs.
心理健康与安全 Psychological Health and Safety	7
人文素养与写作 Humanistic Accomplishment and Writing	
科学技术与工程 Science and Technology & Engineering	
艺术体验与审美 Art Appreciation and Aesthetics	
国际视野与世界 Contemporary China and the World	
中华文化与文明 Chinese Culture and Civilization	
创业素养与实践	
学分要求：选修学分 7 Demand of Credits: Elective 7	

表二：学科基础课程平台

Form II. Basic Course Platform

课程类别 Course Classified	课程编号 Courses Code	课程名称 Course Name	学分数 Cr.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
学科基础 必修 Basic Courses Required	2101000113	高等数学 A(1) Advanced Mathematics A(1)	4	80	64			16	1	
	2101000118	线性代数 Linear Algebra	2	48	32			16	1	
	212100023923	电路分析 Circuit Analysis	2/0.5	52	32	12		8	2	
	210100025623	高等数学 A(2) Advanced Mathematics A(2)	4.5	96	72			24	2	
	209100064918	人工智能与 Python 程序设计 Artificial Intelligence and Python Programming	1.5/1	56	24	32			2	AI 类
	211100010918	大学物理 A(1) College Physics A(1)	3	56	48			8	2	
	211112003313	大学物理 A(1)实验 Lab of College Physics A(1)	0/0.5	16	0	16			2	
	212100029623	模拟电子技术 Analog Electronics	3.5	56	56				3	
	212110026323	模拟电子技术实验 Experiments in analog electronics	0/1	24	0	24			3	
	211100011018	大学物理 A(2) College Physics A(2)	3	56	48			8	3	
	211112003413	大学物理 A(2)实验 Lab of College Physics A(2)	0/0.5	16	0	16			3	
	2101000112	概率论与数理统计 Probability and mathematical statistics	2.5	56	40			16	3	
	210100025423	复变函数 (B) Functions of Complex Variable (B)	2	48	32			16	3	
	212110026423	数字电路与 EDA 技术 Digital Electronic Technology and EDA	3	48	48				4	
	212110026423	数字电路与 EDA 技术实验 Digital Electronic Technology and EDA Experiment	0/1	24	0	24			4	

	212103003613	信号与系统 Signal and System	3.5	64	56			8	4	
	212100029123	工程项目管理与经济 决策 Engineering Project Management and Economic Decision-Making	1	16	16				5	
学分要求：必修学分 40										

表三：专业课程平台

Form III: Major Course Platform

课程类别 Course Classified	课程编号 Course Code	课程名称 Course Name	学分 Crs.	总学时 Hrs	学时类型 Period Classified				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
专业必修 Required Courses	212100029323	数据结构与算法分析 Data Structures and Algorithm Analysis	2.5/1	64	40	24			4	铸牢类
	212103002813	数据库原理 Database Principle	2.5/1	64	40	24			4	铸牢类
	212103006213	解剖生理学 Anatomy and Physiology	3.5	64	56			8	5	铸牢类
	212110023423	解剖生理学实验 Anatomy and Physiology Experiment	0/1.5	36	0	36			5	
	212100023623	生物医学数字信号处理 Biomedical Digital Signal Processing	3/0.5	60	48	12			5	
	212100020818	医学信息系统 Medical Information System	1.5/0.5	36	24	12			5	铸牢类 AI 类
专业选修 Elective courses	212100022623	工程制图 Engineering Drafting	2/0.5	44	32	12			1	需注明选修学分要求和学生在某一学期最少选修学分
	212100022823	生物医学工程前沿 Frontiers in Biomedical Engineering	1	16	16				1	
	212100023123	医用基础化学 Medical Foundation Chemistry	2/0.5	44	32	12			1	
	212103001113	临床医学概论 Introduction to Clinical Medicine	2	32	32				1	第 1 学期不少于选 3.5 学分
	212100023023	生物医学工程伦理 Ethics and Professional Norms of Biomedical Engineering	2	32	32				2	第 2 学期最少选 2.5 学分
	212100024623	生物化学 Biochemistry	2/0.5	44	32	12			2	
	212100024223	程序设计 (C/C++) Programming C/C++	3/1	72	48	24			3	铸牢类
	212100008913	分子生物学 Molecular Biology	2	32	32				3	第 3 学期最少选 4 学分
	212100009113	医学细胞生物学 Medical Cell Biology	2	32	32				3	
	212100027923	医学大数据分析 Big Data Analytics for Healthcare	2	32	32				4	AI 类 第 4 学期最少选 4.5 学分
	210100027023	人工智能数学基础 Mathematical Foundations of Artificial Intelligence	2	32	32				4	

课程类别 Course Classified	课程编号 Course Code	课程名称 Course Name	学分 数 Crs.	总学 时 Hrs	学时类型 Period Classified				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
	212110025423	医学细胞与分子检测实验 Medical Cell and Molecular Detection Experiment	0/1	24	0	24			4	第 5 学期最少 选 5.5 学分 AI 类 第 6 学期最少 选 4.5 学分 AI 类 AI 类
	212103006513	生物统计学 Biostatistics	2	32	32				4	
	212100025923	生物材料（A） Biomaterials（A）	2	32	32				7	
	212100025523	面向对象程序设计（JAVA） Object Oriented Programming（JAVA ）	2/0.5	44	32	12			5	
	212100028323	医学图像处理与深度学习 Medical Image Processing and Deep Learning	3.5/1	80	56	24			5	
	212103003413	信息与编码 Information and Coding	2	32	32				5	
	212103004313	医学成像技术与设备 Medical Imaging Technology and Equipment	2.5	40	40				5	
	212100030423	自然语言处理 Natural Language Processing	2/0.5	44	32	12			5	
	212100019218	生物芯片 Biochip	2	32	32				6	
	212100027623	软件工程 Software Engineering	2/0.5	44	32	12			6	
	212100010218	医学人工智能 Medical Artificial Intelligence	2	32	32				6	
	212103004913	数据库技术及应用（双语） Database Technology and its Application（Bilingual）	2	32	32				6	
	212100025723	生物医学信息检索（双语） Biomedical Information Retrieval（Bilingual）	1	16	16				6	
	212100028523	移动医疗 APP 开发与应用 Mobile Medical APP Development and Application	2/0.5	44	32	12			5	
	212103001613	数据结构与算法分析（双语） Data Structure and Algorithm Analysis（Bilingual）	2	32	32				7	
	212100024323	医疗器械管理与法规 Medical Device Management and Regulations	2	32	32				7	
学分要求: 42（其中必修学分 17.5，选修学分 24.5） Demand of Credits: 42（ Required 17.5, Elective 24.5）										

表四：集中性实践课程平台

Form IV: Practical Course Platform

课程类别 Course Classified			课程编号 Course Code	课程名称 Course Name	学分 Crs.	周数/学时数 Total Period/Hrs.	学时类型 Period Classified		开课学期 Semester
							实践 Exp.	实习 Pra.	
实践 Practice	实践 Course Practice	必修 Compul sory Courses	112110010718	劳动教育 Labor Education	1	32	√		1-7
			109110000318	军事技能训练 Military Skill Training	/2	36	√		1
			212110026123	电子实训 Electrical Engineering Training	0/1	1W		√	2
		选修 Elective Courses	212110019918	医学信息工程实践 Medical information Engineering Practice	2	2W	√		7
			212110026023	医学临床工程实践 Medical Clinical Engineering Practice	2	12W	√		7
	课程设计 Project Design	必修 Compul sory Course	212110029923	医学大数据分析课程设计 Medical Big Data Analytics Course Design	2	2W			4
			212110021518	医学信息程序课程设计 Project of Medical information Software Technique Design	2	2W			5
			212110021218	医学信息系统课程设计 Medical Information System Design	2	2W			6 AI 类
		选修 Elective Courses							
	小计 Amount		必修学分 10，选修学分 2						
实习 internship	专业实习 Course internship	必修 Compul sory Course	212110019018	专业认知实习 Professional recognizing practice	1	1W		√	2
			701110000118	工程训练 A Engineering training A	1	24		√	5
			212110020918	专业实习 Professional Practice	2	2W		√	5
	毕业论文 (设计) Graduation Thesis (Project)	必修 Compul sory Course	01845010	毕业论文 Undergraduate Thesis	10	12W			8
	小计 Amount		必修学分 14						
学分要求: 24（必修学分 24，选修学分 0） Demand of Credits: 25 (Required23, Elective 2)									

表五：素质拓展平台

Form V: Quality Development Platform

课程编号 Course Code	课程/模块名称 Course Name	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester
				理论 The.	实验 Exp.	实践 Pra.	习题 Ueb	
109100000418	军事理论 Military Theory	2	36	36				1
109100000818	国家安全教育 National Security Education	1	16	16				2
	美育实践	1	/			/		1-7
/	创新教育 Innovation Education	2	/					
115100000213	大学生职业生涯与发展规划 Career and Development Planning of University Students	1	16	16				1
115100000113	就业指导 Employment Guidance	1	16	16				6
学分要求：必修学分 8 Demand of Credits: Required 8								

执笔人：

学院盖章：

审核人：

完成日期：