中南民族大学
SOUTH-CENTRAL MINZU UNIVERSITY

生物医学工程学院

本科培养方案

生物医学工程学院

2024 年 3 月

目 录

中南民族大学简介

中南民族大学是直属于国家民族事务委员会的综合性普通高等学校，国家民族事务委员会、教育部、湖北省、武汉市共建高校，坐落于白云黄鹤的故乡——武汉南湖之滨。学校创建于 1951 年，是新中国成立后最早建立的民族高校之一。建校以来，学校始终坚持社会主义办学方向，贯彻落实党的教育方针和民族政策，以铸牢中华民族共同体意识为主线，以立德树人为根本任务，各项事业获得了快速发展。

学校占地 1550 余亩，校舍面积 110 万余平米。校园内绿树成荫、花香四季，具有浓郁民族特色的现代建筑鳞次栉比，湖光山色与人文景观交相辉映，构成了教学、科研和生活的优美环境。

办学基础稳步夯实。学校现有 56 个民族的全日制博士、硕士、本科、预科等各类学生 29000 余人。学校现有 4 个一级学科博士点，25 个学术型一级学科硕士点，20 个专业型硕士点。现有本科招生专业 82 个，涵盖 10 大学科门类。

获批一流本科专业建设点 52 个（国家级 24 个），环境工程专业通过工程教育专业认证，获得国家级“新工科”项目 4 项、“新农科”项目 5 项、“新文科”项目 4 项，获批国家级一流本科课程 9 门、教育部课程思政示范项目 2 项。2018 年 1 月，学校入选湖北省“国内一流大学建设高校”，其中民族学、化学和药学 3 个学科入选“国内一流学科建设学科”。2017 年，民族学在教育部学科评估中被评为 A 类学科；化学、工程学、材料科学 3 个学科进入 ESI 学科排名全球前 1%。现有教职工 2200 余人，各类专任教师 1400 余人，专任教师中具有博士学位的占 60%。拥有“黄大年式教师团队”，引培了国家“杰青”、国家“优青”、国家“万人计划”领军人才等一批高层次人才。近五年，学校获批国家级科研项目 301 项，其中重大重点项目 36 项；发表 CSSCI 期刊论文 815 篇；发表 SCI 期刊论文 1976 篇；出版高水平学术专著 279 部，获批授权发明专利 498 项，获省部级科研奖励 122 项；制定中药材艾叶国际标准 1 项；湖北全面小康建设研究院入选 2017 年度中国核心智库，建成“国家级科技企业孵化器”、国家级“互联网+中华文明”全国示范基地。学校位列 2019 年全国高校 C 刊论文发表数量排行榜第 86 位，自然指数 2020 年度排 124 位，学报人文社科版、自科版全部入选“RCCSE 中国核心学术期刊”A 等级。

学校影响不断扩大。2012 年，学校获批国家级教师教学发展示范中心，是非“985”“211”高校中唯一获批单位；2001 年、2006 年、2016 年，连续三次在教育部本科

教学水平评估中成绩优异。2017 年 8 月，获评“全国创新创业教育深化改革示范高校”。2017 年 9 月，学校人才培养成果入选中共中央宣传部等部门主办的“砥砺奋进的五年”大型成就展。建校 70 年来，累计培养了 17 万余名高素质人才。近年来，学校承担扶持人口较少民族发展“十三五”规划编制工作，利用自身科研优势建设多个服务民族地区产业发展平台，推进国家民委派驻武陵山片区联络员、“1221”精准扶贫工作、驻村扶贫工作队、“616”对口支援长阳县、对口支援三峡库区移民工程、定点帮扶恩施市基础教育、博士服务团、“三万”活动、科技副县长、基层高质量发展专才支持计划等工程，累计派出干部、教师 144 人次，投入各类扶贫专项资金 5000 余万元，先后与恩施州、铜仁市、张家界市、湘西州、怀化市、黔西南州等签订战略合作协议，全面加强与武陵山片区、巴林右旗、德保县、乐安县等地区在人才培养、智库服务、科学研究与成果转化、文化建设、农产品销售渠道拓展等领域的深度合作。学校与境外 50 余所大学建立了校际交流与合作关系，与武汉大学、重庆大学等数十家国内高校开展联合培养、互访互学等深度合作。

立德树人成效显著。学校深入学习贯彻党的十九大精神，持续贯彻中央民族工作会议、全国民族团结进步表彰大会、全国高校思想政治工作会议和全国教育大会等精神，围绕“中华民族一家亲、同心共筑中国梦”主题，大力开展“五个认同”教育，被国务院、国家民委、湖北省、武汉市授予“民族团结进步模范单位”“民族团结进步模范集体”“全国民族团结进步创建活动示范高校”等称号。多次被湖北省委评为“党建工作先进单位”“先进党委中心组”“先进基层党组织”，连续 19 年被评为湖北省最佳文明单位，连续多年获得教育部、湖北省高校校园文化建设优秀成果奖，涌现出“全国模范教师”“全国师德标兵”“湖北省十佳班主任”“中国大学生年度人物”“中国大学生自强之星标兵”等一大批优秀师生代表。

进入新时代，启航新征程。学校坚持以习近平新时代中国特色社会主义思想为指导，认真学习贯彻习近平总书记关于加强和改进民族工作的重要思想、关于教育的重要论述，把握新发展阶段，贯彻新发展理念，着眼国家战略需求，服务地方经济社会发展，以铸牢中华民族共同体意识为主线，以立德树人为根本任务，围绕“四个服务”办学要求，大力实施“质量立校、学科兴校、人才强校、特色荣校”战略，努力建设国内一流、人民满意的高水平现代化综合大学，培养德智体美劳全面发展的社会主义建设者和接班人。

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37名，其中教授10人，副教授12人，具有博士学位35人，入选国家民委中青年英才计划2人，入选湖北省优秀青年骨干计划1人，入选湖北名师1人，硕士生导师29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和医学信息工程2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），在校本科生约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、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。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 50 余项，在国内外重要学术期刊上发表 SCI、EI 收录学术论文 100 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。近 5 年来，学院就业率和就业质量稳居学校前列，2015、2016 年、2022 年度被评为学校就业标兵单位，2018 年为就业先进单位，本科生升学率一直保持在 30%左右。

专业简介

生物医学工程专业

生物医学工程是综合生物学、医学和工程学的理论和方法而发展起来的交叉性学科，其基本任务是运用工程技术手段，研究和解决生物学和医学中的有关问题。本专业主要学习基础医学、生物学、电子技术、计算机技术、生物医学信息检测与信号处理、以及医疗仪器设计原理等专业基础理论和基本知识。重视电子技术、信号检测与处理、计算机技术、生物技术应用于医学领域的基本训练，培养能从事医学仪器研究、开发、管理、临床应用、以及其它电子信息技术行业工作的高级技术人才。本科，学制四年，招理科生，毕业生授予工学学士学位。

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。

智能医学工程卓越工程师实验班

智能医学工程卓越工程师班是以现代医学与生物学理论为基础，融合先进的人工智能及相关领域的工程技术手段，探索人机协同的智能化诊疗方法及其临床应用。主要学习基础医学、生物学、电子技术、计算机技术、机器学习、生物医学信息检测与信号处理、以及医疗仪器设计原理等专业基础理论和基本知识。将先进的脑认知、大数据、云计算、深度学习等人工智能手段应用于医学领域的基本训练，培养能在智能医学以及其它人类健康工程相关行业从事研发和管理的复合型卓越人才。本科，学制四年，招理科生，毕业生授予工学学士学位。

专业大类构成表

Formation of Major Category

大类名称 **Name**	专业名称 **Major**	所属专业门类 **Major Category**	大类培养时间 **Semester**
生物医学工程类	生物医学工程	生物医学工程类	第 1 学期至 第 2 学期 Semester 1 to 2
	医学信息工程	电子信息类	

实验班开设情况

Experimental Class

实验班名称 **Name**	所在专业 **Major**	开设学期 **Semester**
智能医学工程卓越工程师实验班	生物医学工程	第 3 学期 **Semester3**

生物医学工程专业本科培养方案

Undergraduate Program for Specialty of Biomedical Engineering

一、培养规格

I Cultivation Standards

I）学制

Length of Schooling

修业年限：4 年

Duration: 4 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

本专业面向健康中国产业发展，培养具有社会主义核心价值观、社会责任感、中华民族共同体意识，具备扎实的生物医学基础、工程基础和电子技术、信息技术专业知识，较强的工程开发能力、创新创业意识和创新创业能力，具有良好人文素养、大健康观和国际视野的高素质复合型人才。毕业后能从事生物医学工程领域相关教育、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。工作五年左右，可成为单位、领域或行业技术骨干，能够达到如下目标要求：

目标 1：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；

目标 2：在解决生物医学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，应用生物医学工程专业知识、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；

目标 3：在生物医学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；

目标 4：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；

目标 5：具有终身学习和自主学习的意识，能跟踪生物医学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。

This major is aimed at the development of the health industry in China, cultivating individuals with socialist core values, a sense of social responsibility, awareness of the Chinese national community, and a solid foundation in biomedical, engineering, electronic, and information technology. Graduates should possess strong engineering development capabilities, innovative and entrepreneurial awareness, and the ability to innovate and start businesses. They should also have good humanistic qualities, a broad perspective on health, and an international outlook, making them high-quality and versatile talents. After graduation, they should be able to engage in education, research, development, management, and service work related to biomedical engineering, solving complex engineering problems in the field of life and health.

In about five years of work, they should be able to become technical backbones in their units, fields, or industries, achieving the following goals:

Objective 1: Possess a strong foundation in the humanities, engineering professional ethics, and a sense of social responsibility. Consider the impact of society, health, safety, law, and culture in engineering practice. Fulfill engineering responsibilities, foster a sense of community for the Chinese nation, and contribute to the health sector at the national, regional, and ethnic levels.

Objective 2: When addressing complex engineering problems in the field of biomedical engineering and related areas, be able to apply mathematical and natural science principles, utilize knowledge in biomedical engineering, engineering skills, and modern tools to analyze and research problems, and design feasible solutions.

Objective 3: In engineering projects within the field of biomedical engineering and related areas, possess capabilities in technical development, engineering practice, organizational management, and decision-making. Consider factors such as natural, social ethics, and sustainable development. Become a technical cornerstone, key personnel, or

organizational leader.

Objective 4: Possess excellent communication and expression abilities, as well as an international perspective. Be able to contribute effectively in multicultural, multidisciplinary, and cross-cultural environments and teams.

Objective 5: Demonstrate awareness of lifelong learning and self-directed learning. Stay abreast of the latest theories, technologies, and trends in the field of biomedical engineering. Possess the ability to continuously adapt to societal development and industry competition.

三、毕业要求

III Basic Requirements for Graduation

1、工程知识：能够将数学、自然科学、工程基础和专业知识用于解决生物医学工程相关问题。

1-1：掌握数学、自然科学和工程基础知识，能够将其运用到生物医学工程问题的恰当表述中。

1-2：掌握生物医学工程基础理论与专业知识，能够应用于生物医学工程及相关领域内具体工程问题的建模和求解。

1-3：能将相关工程知识及数学模型方法用于推演、分析生物医学工程及相关领域的复杂工程问题。

1-4：具有系统思维的能力，将相关专业知识和数学模型应用于生物医学工程及相关领域复杂工程问题解决方案的比较与综合。

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复杂工程问题，以获得有效结论。

2-1：能够基于数学和自然科学的基本原理，识别生物医学工程领域需要解决的问题，判断其中的关键环节。

2-2：能够基于工程科学的基本原理和数学模型方法，正确表达生物医学工程领域中的工程问题，并认识到解决问题方案的多样性。

2-3：能够运用数学、自然科学和工程科学的基本原理，借助文献研究，分析生物医学工程领域的复杂工程问题，形成分析报告，获得有效结论。

3、设计/开发解决方案：能够设计针对复杂设计问题的解决方案，设计满足特定需

求的系统、单元（部件）或工艺流程，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

3-1：掌握生物医学工程及相关领域的系统设计和产品开发的基本方法和技术，能够针对复杂工程问题的设计目标给出技术解决方案。

3-2：能够在解决方案的框架下，针对生物医学工程及相关领域的复杂工程问题，设计满足特定需求的算法、电路、软件或系统。

3-3：能够在工程设计中体现创新意识，综合考虑公共健康与安全、节能减排与环境保护、法律和伦理，以及社会与文化等因素。

4、研究：能够基于科学原理并采用科学方法对仪器设计问题进行研究，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。

4-1：能够基于生物医学工程专业基础理论和科学原理，通过文献研究或相关方法，调研和分析复杂工程问题的解决方案。

4-2：能够根据研究目标，选择合理的研究路线，设计可行的实验方案，采用科学的实验方法，安全规范地开展实验并获取数据。

4-3：能正确分析和解释数据，并通过信息综合得到科学合理有效的结论。

5、使用现代工具：能够针对复杂工程问题，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。

5-1：了解生物医学工程专业常用的现代仪器、信息技术工具、工程工具和模拟软件的使用原理和方法，并理解其局限性。能选择和使用恰当的工具，针对复杂工程问题进行分析、计算和设计。

5-2：能够针对具体的工程问题，通过组合、选配、改进、二次开发等方式创造性地使用现代工具进行模拟和预测，满足特定需求。

6、工程与社会：能够基于工程相关背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

6-1：了解生物医学工程专业及相关领域的技术标准体系、知识产权、产业政策与法律法规，理解不同社会文化对工程活动的影响。

6-2：能分析和评价工程实践对社会、健康、安全、法律、文化的影响，并理解应

承担的责任。

7、环境和可持续发展：能够理解和评价针对复杂工程问题的工程实践对环境、社会可持续发展的影响。

7-1：了解与生物医学工程相关行业的环境保护、可持续发展等方面的方针、政策和法律、法规。

7-2：理解工程实践中所应承担的责任，能够正确认识并评价工程实践对环境、社会可持续发展的影响，推动民族地区健康发展。

8、职业规范：具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。

8-1：牢固树立中华民族共同体意识，具备健全的人格、较好的人文社会科学素养，有正确价值观，理解个人与社会的关系。

8-2：恪守工程伦理、理解并遵守工程职业道德和规范，尊重国家和国际通行的法律法规。

8-3：在工程实践中，能自觉履行工程师对公众的安全、健康和福祉社会责任，理解和包容多元化的社会需求。

9、个人和团队：能够在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。

9-1：能够在多学科背景下的团队中分工与协作，正确处理个人与团队的关系，承担团队成员的责任，完成相应的任务。

9-2：具备一定的组织管理能力，能制订有效的工作计划，并根据团队成员能力与特长合理地分配工作，协调进度，完成任务。

10、沟通：能够就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。并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

10-1：能够以口头或书面方式清晰准确地表达生物医学工程及相关领域的专业问题，能与业界同行及社会公众进行有效沟通和交流，能应用现代网络工具进行在线沟通交流。

10-2：能理解不同民族和不同文化的差异，具备跨民族、跨文化背景下沟通和交流的能力。

10-3：具有一定的国际视野，了解生物医学工程及相关领域理论研究与技术发展的

国际前沿动态。

11、项目管理：理解并掌握工程管理原理与经济决策方法，并能在多学科环境中应用。

11-1：了解工程管理涉及的问题，掌握工程管理基本原理、经济分析与决策方法。

11-2：能够运用系统工程的观点、理论和方法，在多学科环境中对项目进行管理并解决问题。

12、终身学习：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

12-1：具有自主学习意识，理解终身学习的必要性。

12-2：掌握自主学习的方法和拓展知识、提高能力的途径，具备为适应发展而自我提高的能力。

1、Engineering Knowledge: The ability to apply mathematics, natural sciences, engineering fundamentals, and specialized knowledge to solve problems in biomedical engineering.

1-1: Master fundamental knowledge in mathematics, natural sciences, and engineering foundations, and apply them appropriately to articulate problems in biomedical engineering.

1-2: Possess foundational theories and specialized knowledge in biomedical engineering, apply them to model and solve specific engineering problems in biomedical engineering and related fields.

1-3: Apply relevant engineering knowledge and mathematical modeling methods to deduce and analyze complex engineering problems in biomedical engineering and related fields.

1-4: Demonstrate systematic thinking, compare, and integrate relevant professional knowledge and mathematical models to formulate solutions for complex engineering problems in biomedical engineering and related fields.

2、Problem Analysis: The capability to apply the basic principles of mathematics, natural sciences, and engineering science to identify, articulate, and analyze complex engineering problems through literature research, leading to effective conclusions.

2-1: Identify problems in biomedical engineering based on mathematical and natural

science principles, discerning critical components.

2-2: Express engineering problems in biomedical engineering accurately using principles of engineering science and mathematical modeling, recognizing diverse solution approaches.

2-3: Analyze complex engineering problems in biomedical engineering through the application of mathematical, natural science, and engineering principles, conduct literature research, and produce analysis reports leading to valid conclusions.

3、Design/Development of Solutions: The ability to design solutions for complex problems, develop systems, units (components), or process flows that meet specific requirements, while demonstrating innovation and considering societal, health, safety, legal, cultural, and environmental factors during the design process.

3-1: Master basic methods and techniques for system design and product development in biomedical engineering and related fields, providing technical solutions for complex engineering problems.

3-2: Design algorithms, circuits, software, or systems meeting specific requirements for complex engineering problems in biomedical engineering and related fields within a solution framework.

3-3: Demonstrate innovation in engineering design, consider public health and safety, energy conservation, environmental protection, legal and ethical aspects, as well as social and cultural factors.

4、Research: The ability to conduct research on instrument design problems based on scientific principles and employing scientific methods. This includes designing experiments, analyzing and interpreting data, and synthesizing information to derive rational and effective conclusions.

4-1: Research and analyze solutions to complex engineering problems in biomedical engineering using principles of biomedical engineering and scientific theory through literature review or related methods.

4-2: Design feasible experimental plans, conduct experiments safely and ethically,

analyze and interpret data, and draw scientifically sound conclusions.

4-3: Properly analyze and interpret data, obtaining scientifically valid conclusions through information synthesis.

5、Use of Modern Tools: The ability to develop, select, and use appropriate technologies, resources, modern engineering tools, and information technology tools to address complex engineering problems. This includes predicting and simulating solutions for complex engineering issues, while understanding the limitations of these tools.

5-1: Understand principles and methods of commonly used modern instruments, information technology tools, engineering tools, and simulation software in biomedical engineering. Select and use appropriate tools to analyze, calculate, and design solutions for complex engineering problems.

5-2: Creatively use modern tools for simulation and prediction in various ways, such as combining, adapting, improving, or developing, to meet specific needs.

6、Engineering and Society: The ability to conduct a reasonable analysis, evaluate the impact of professional engineering practices and solutions to complex engineering problems on society, health, safety, law, and culture based on relevant engineering knowledge, and understand the responsibilities associated with these impacts.

6-1: Understand technical standards, intellectual property, industry policies, laws, and regulations related to biomedical engineering and relevant fields. Recognize the impact of different social cultures on engineering activities.

6-2: Analyze and evaluate the impact of engineering practice on society, health, safety, law, culture, and understand the responsibilities involved.

7、Environment and Sustainable Development: The ability to comprehend and evaluate the impact of engineering practices on the environment and social sustainability concerning complex engineering problems.

7-1: Understand policies, regulations, and guidelines related to environmental protection

and sustainable development in industries associated with biomedical engineering.

7-2: Recognize responsibilities in engineering practices, accurately assess the impact of engineering activities on the environment and social sustainability, and contribute to the healthy development of national regions.

8、Professional Ethics: The possession of humanistic and social science literacy, a sense of social responsibility, and the ability to understand and adhere to engineering professional ethics and standards while fulfilling responsibilities in engineering practice.

8-1: Develop a strong sense of community awareness, possess sound character, good humanistic and social science literacy, and correct values. Understand the relationship between the individual and society.

8-2: Adhere to engineering ethics, understand and comply with professional ethics and standards, and respect national and international laws and regulations.

8-3: Demonstrate a conscious commitment to the safety, health, and well-being of the public in engineering practice, understanding and accommodating diverse societal needs.

9、Individual and Team: The ability to assume roles as an individual, team member, and leader within multidisciplinary teams.

9-1: Collaborate and coordinate within interdisciplinary teams, effectively manage tasks, and assume responsibilities as an individual, team member, or leader.

9-2: Possess organizational and management skills, develop effective work plans, and allocate tasks according to team members' abilities and strengths, ensuring coordination and task completion.

10、Communication: The ability to effectively communicate and engage with peers in the industry and the general public on complex engineering problems. This includes writing reports and designing documents, making presentations, expressing ideas clearly, and responding to instructions. Additionally, possessing a certain level of international perspective to communicate across cultural backgrounds.

10-1: Effectively communicate complex engineering problems in biomedical

engineering and related fields through oral or written means with peers and the public, using modern network tools for online communication.

10-2: Understand differences in ethnic and cultural backgrounds, demonstrate communication skills in cross-ethnic and cross-cultural contexts.

10-3: Have an international perspective, understanding international developments in theoretical research and technological advancements in biomedical engineering and related fields.

11、Project Management: The ability to comprehend and master principles of engineering management and economic decision-making methods, with the capability to apply them in a multidisciplinary environment.

11-1: Understand issues related to engineering management, master basic principles of engineering management, economic analysis, and decision-making methods.

11-2: Apply systems engineering perspectives, theories, and methods to manage projects and solve problems within a multidisciplinary environment.

12、Lifelong Learning: The awareness and capability for self-directed learning and lifelong learning, possessing the ability to continually acquire knowledge and adapt to ongoing developments.

12-1: Demonstrate awareness of self-directed learning and the necessity of lifelong learning.

12-2: Master methods of self-directed learning and pathways to expand knowledge and improve skills. Possess the ability for continuous self-improvement to adapt to development.

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	培养目标 1 Cultivation Objective Ⅰ	培养目标 2 Cultivation Objective II	培养目标 3 Cultivation Objective III	培养目标 4 Cultivation Objective Ⅳ	培养目标 5 Cultivation Objective Ⅴ
毕业要求 1 Graduation Requirement I		√			
毕业要求 2 Graduation Requirement II		√			√
毕业要求 3 Graduation Requirement Ⅲ		√	√		√
毕业要求 4 Graduation Requirement Ⅳ		√	√		√
毕业要求 5 Graduation Requirement Ⅴ		√	√		
毕业要求 6 Graduation Requirement Ⅵ	√		√		
毕业要求 7 Graduation Requirement Ⅶ	√		√		
毕业要求 8 Graduation Requirement Ⅷ	√				
毕业要求 9 Graduation Requirement Ⅸ			√	√	
毕业要求 10 Graduation Requirement Ⅹ				√	
毕业要求 11 Graduation Requirement XI			√	√	
毕业要求 12 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 工程与社会 Engineering and Society		7 环境和可持续发展 Environment and Sustainable Development		8 职业规范 Professional norms			9 个人和团队 Individual and Team		10 沟通 Communication			11 项目管理 Project Management		12 终身学习 Lifelong Learning	
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	10.1	10.2	10.3	11.1	11.2	12.1	12.2
英语 English																										M					
思想道德与法治 Moral Education and Rule of Law																				M											
形势与政策 Situation and Policy																		M		M											M
中华民族共同体概论 Education of Chinese Minzu Community Consciousness																										H					
中国近现代史纲要 Essentials of China Modern and Contemporary History																				M											
马克思主义基本原理 Basis Principles of Marxism																				M											
毛泽东思想和中																				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 工程与社会 Engineering and Society		7 环境和可持续发展 Environment and Sustainable Development		8 职业规范 Professional norms			9 个人和团队 Individual and Team		10 沟通 Communication			11 项目管理 Project Management		12 终身学习 Lifelong Learning	
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	10.1	10.2	10.3	11.1	11.2	12.1	12.2
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																															
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																				M											
工程制图 Engineering Drafting	M														L																
线性代数 Linear Algebra	M																														
高等数学 Advanced Mathematics	M																														
复变函数 Complex Function	L																														
概率论与数理统计 Probability Theory and Mathematic Statistics	M																														
C 程序设计及医学应用								L							H																

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 工程与社会 Engineering and Society		7 环境和可持续发展 Environment and Sustainable Development		8 职业规范 Professional norms			9 个人和团队 Individual and Team		10 沟通 Communication			11 项目管理 Project Management		12 终身学习 Lifelong Learning	
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	10.1	10.2	10.3	11.1	11.2	12.1	12.2
C Programming and Medical Applications																															
电路分析 Circuit Analysis			H			M																									
大学物理 College Physics	M																														
大学物理实验 Lab of College Physics		M										L																			
模拟电子技术实验 Analog Electronic Experiment						M		M							L																
模拟电子技术 Analog Electronic Technology		H				M																									
信号与系统 Signal and System			H			M																									
数字电子技术与 EDA 实验 Digital Electronic Technology and EDA Experiment						M		M							L																
数字电子技术 Digital Electronic Technology		H				M																									
生物医学工程导论 Introduction to Biomedical Engineering																H			M											H	

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 工程与社会 Engineering and Society		7 环境和可持续发展 Environment and Sustainable Development		8 职业规范 Professional norms			9 个人和团队 Individual and Team		10 沟通 Communication			11 项目管理 Project Management		12 终身学习 Lifelong Learning	
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生物医学传感器 Biomedical Sensors			H						M																						
解剖生理学实验 Anatomy and Physiology Experiment										M		M					L														
解剖生理学 Anatomy and Physiology	H																				L										
生物医学数字信号处理 Biomedical Digital Signal Processing			H						M						L																
医学信号检测技术与仪器 Medical Signal Detection Technology and Instruments								H			M			M																	
医学成像技术与设备 Medical Imaging Technology and Equipment			H																												
医学仪器综合实验 Comprehensive Experiment of Medical Instruments				M	M					M					L																
劳动教育 Labor Education																				H											

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 工程与社会 Engineering and Society		7 环境和可持续发展 Environment and Sustainable Development		8 职业规范 Professional norms			9 个人和团队 Individual and Team		10 沟通 Communication			11 项目管理 Project Management		12 终身学习 Lifelong Learning	
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军事技能训练 Military Skill Training																				M											
工程管理与经济决策 Engineering Management and Economic Decision																			M									H	M		
生物医学电子技术课程设计 Course design of Biomedical Electronic Technology							M		H					M									M		M						
医疗仪器与系统课程设计 Curriculum Design of Medical Instrument and System							M		H						M									H				L			
系统生物医学综合实践 Comprehensive Practice of System Biomedical Science					M							H		M									M								
系统生物医学科学实训 System Biomedical Science Training					M							H			M									H							
电子实训 Electrical Engineering Training															M										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 工程与社会 Engineering and Society		7 环境和可持续发展 Environment and Sustainable Development		8 职业规范 Professional norms			9 个人和团队 Individual and Team		10 沟通 Communication			11 项目管理 Project Management		12 终身学习 Lifelong Learning	
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工程训练 A Engineering Training A																	H				H										
专业认知实习 Professional recognizing practice																M		L												M	
专业实习 Professional Practice																H		M				M	M		M						
毕业实习 Practice of Graduation Design																	M					M			H						
毕业论文（设计） Undergraduate Thesis (Project)				M			M		H				H														H				L

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、电路分析 Circuit Analysis、模拟电子技术 Analog Electronic Technology、数字电子技术 Digital Electronic Technology、C 程序设计及医学应用 C Programming and Medical Applications、信号与系统 Signal and System、生物医学数字信号处理 Biomedical Digital Signal Processing、生物医学传感器 Biomedical Sensors、医学信号检测技术与仪器 Medical Signal Detection Technology and Instruments、医学成像技术与设备 Medical Imaging Technology and Equipment

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、生物医学电子技术课程设计 Course Design of Biomedical Electronic Technology、医学仪器与系统课程设计 Curriculum Design of Medical Instrument and System、医学仪器综合实验 Comprehensive Experiment of Medical Instruments、系统生物医学综合实践 Comprehensive Practice of System Biomedical Science、系统生物医学科学实训 Systematic Biomedical Science Training、创新创业活动 Innovation and Entrepreneurship、专业实习 Professional Practice、毕业实习 Practice of Graduation、毕业论文（设计）Undergraduate Thesis (Project)

八、学时与学分

VIII Hours/Credits

学时学分构成表

Table of Hours and Credits

<table>
<tr><th colspan="3" rowspan="2">课程类别
Course Classified</th><th rowspan="2">学时/周数
Period/Weeks</th><th colspan="2">学分
Credits</th><th rowspan="2">学分比例
Proportion of Credits</th></tr>
<tr><th>理论
Theory</th><th>实践（双创）
Practice（I&E Crs.)</th></tr>
<tr><td colspan="2" rowspan="2">通识课程平台
General Course Platform</td><td>必修
Compulsory</td><td>594</td><td>25</td><td>7</td><td>18.82%</td></tr>
<tr><td>选修
Elective</td><td>144</td><td>9</td><td>0</td><td>5.29%</td></tr>
<tr><td colspan="2">学科基础课程平台
Basic Course Platform</td><td>必修
Compulsory</td><td>920</td><td>41.5</td><td>5</td><td>27.35%</td></tr>
<tr><td colspan="2" rowspan="2">专业课程平台
Major Course Platform</td><td>必修
Compulsory</td><td>364</td><td>16</td><td>3.5</td><td>11.47%</td></tr>
<tr><td>选修
Elective</td><td>456</td><td>21</td><td>5</td><td>15.29%</td></tr>
<tr><td colspan="2" rowspan="2">集中性实践课程平台
Practical Teaching Platform</td><td>必修
Compulsory</td><td>72+26w</td><td>0</td><td>25</td><td rowspan="2">15.88%</td></tr>
<tr><td>选修
Elective</td><td>2w</td><td>0</td><td>2</td></tr>
<tr><td rowspan="2">素质拓展平台
Quality Development Platform</td><td>双创学分
Innovation & Entrepreneurship Credits</td><td rowspan="2">必修
Compulsory</td><td>/</td><td>/</td><td>5</td><td>2.94%</td></tr>
<tr><td>其他学分
Other Credits</td><td>92</td><td>4</td><td>1</td><td>2.94%</td></tr>
<tr><td rowspan="2">小计
Amount</td><td colspan="2">必修学分总数
Compulsory Credits</td><td>133</td><td>选修学分总数
Elective Credits</td><td>37</td><td>选修学分比例
Proportion of Elective Credits</td><td>21.76%</td></tr>
<tr><td colspan="2">理论学分总数
Theory Credits</td><td>116.5</td><td>实践学分总数
Practice Credits</td><td>48.5</td><td>实践教学环节比例
Proportion of Internship and Practical Training</td><td>25.59%</td></tr>
<tr><td colspan="3">最低毕业学分
The Lowest Graduate Credits</td><td colspan="5">170</td></tr>
</table>

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				2
225100000118	中华民族共同体概论 Education of Chinese Minzu Community Consciousness	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		3
20W100000813	英语 3 English 3	2	32	32				3
218110015018	体育 3 Physical Education 3	0/0.5	16			16		3
217100012318	马克思主义基本原理 Basis Principles of Marxism	2.5/0.5	52	40		12		4
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		5
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		6
20W100000913	英语 4 English 4	2	32	32				4

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	
218110014718	体育 4 Physical Education 4	0/0.5	16			16		4
218110014018	体育 5 Physical Education 3	0/0.5	16			16		5
218110015318	体育 6 Physical Education 3	0/0.5	16			16		6
208100000613	大学生心理健康 Psychological Health of University Students	1	16	16				1
学分要求：必修学分 32 **Demand of Credits: Required 32**								

注：大学英语扩展课程包括① 20W100000813 英语 3② 20W100000913 英语 4③ 20W100001018 学术英语阅读与写作④ 20W100001318 高级媒体英语视听说⑤ 20W100001518 英语国家社会与文化⑥ 20W100001618 中华文化导论（英文），要求在第 3、4 学期完成 4 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	2
人文素养与写作 Humanistic Accomplishment and Writing	2
科学技术与科普 Science and Technology & Science Popularization	2
艺术体验与审美 Art Appreciation and Aesthetics	1
国际视野与世界 Contemporary China and the World	1
中华文化与文明 Chinese Culture and Civilization	1
学分要求：选修学分 9 **Demand of Credits: Elective 9**	

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 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		
学科基础必修 Basic Courses Required	212100012318	工程制图 Engineering Drafting	2/0.5	44	32	12			1	
	2101000118	线性代数 Linear Algebra	2	48	32			16	1	
	2101000113	高等数学 A(1) Advanced Mathematics A(1)	4	80	64			16	1	
	212100020218	C 程序设计及医学应用 C Programming and Medical Applications	2/1	56	32	24			1	
	210102000413	高等数学 A(2) Advanced Mathematics A(2)	5	96	80			16	2	
	212100012618	电路分析 Circuit Analysis	3.5/0.5	76	56	12	8		2	
	211110021318	大学物理实验(1) Lab of College Physics A(1)	0/0.5	16	0	16			2	
	211100010918	大学物理 A(1) College Physics A(1)	3	56	48			8	2	
	212110010518	模拟电子技术实验 Analog Electronic Experiment	0/1	24	0	24			3	
	212103005213	模拟电子技术 Analog Electronic Technology	3.5	64	56			8	3	
	211110022818	大学物理实验(2) Lab of College Physics A(2)	0/0.5	16	0	16			3	
	211100011018	大学物理 A(2) College Physics A(2)	3	56	48			8	3	
	210102000513	复变函数 Functions of Complex Variable	3	64	48			16	3	
	2101000112	概率论与数理统计 Probability and mathematical statistics	2.5	56	40			16	3	
	212103003613	信号与系统 Signal and System	3.5	64	56			8	4	
	212110010618	数字电子技术与 EDA 实验 Digital Electronic Technology and EDA Experiment	0/1	24	0	24			4	
	212103003313	数字电子技术 Digital Electronic Technology	3.5	64	56			8	4	
	212100022218	工程管理与经济决策 Engineering Management and Economic Decision	1	16	16				4	
学分要求：必修学分 46.5 理论 41.5 实践（实验）5 **Demand of Credits: Required 46.5**										

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		
专业必修 Required Courses	212100013018	生物医学工程导论 Introduction to Biomedical Engineering	1	24	16		8		1	
	212100013518	生物医学传感器 Biomedical Sensors	2.5/0.5	52	40	12			4	
	212113005113	解剖生理学实验 Anatomy and Physiology Experiment	0/1	32	0	32			5	
	212103006213	解剖生理学 Anatomy and Physiology	3.5	64	56			8	5	
	212100014818	生物医学数字信号处理 Biomedical Digital Signal Processing	3/0.5	60	48	12			5	
	212100018918	医学信号检测技术与仪器 Medical Signal Detection Technology and Instruments	3.5/0.5	68	56	12			5	
	212103004313	医学成像技术与设备 Medical Imaging Technology and Equipment	2.5	40	40				6	
	212110016818	医学仪器综合实验 Comprehensive experiment of medical instruments	0/1	24		24			6	
	专业课程平台必修　19.5 学分，其中理论 16 学分，实践（实验）3.5 学分									
专业选修 Elective courses	212103004813	生物医学信息检索（双语） Biomedical Information Retrieval (Bilingual)	1	16	16				6	最低学分要求 26 学分，第三、四、五、六、七学期至选修 4、6、2、10、4 学分。(At least 26 credits are required during the undergraduate stages, including at least 4/6/2/10/4 credits in the semester 3/4/5/6/7.
	212100018718	医用化学 Medical Chemistry	2/0.5	44	32	12			2	
	212110020518	计算机程序设计（竞赛课程） Computer Programming （Course for Programming Contest）	0/1			24			2	
	212100019718	生物化学 Biochemistry	2/1	56	32	24			3	
	212100012118	C++程序设计 C++ Programming	2/0.5	44	32	12			3	
	212110015118	细胞与分子检测实验 Analytic Experiment for Cells and Molecules	0/1	24	0	24			3	
	212100009113	医学细胞生物学 Medical Cell Biology	2	32	32				3	

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		
	212100011818	单片机与嵌入式系统设计（电赛课程） Design of MCU and Embedded System (Course for Electronic Design Contest)	2/0.5	44	32	12			3	
	212103001913	计算机网络 Computer Netware	2	32	32				3	
	212100017718	Python 程序设计 Python Programming	2/0.5	44	32	12			3	
	212100011718	嵌入式系统 Embedded System	2/1	56	32	24			4	
	212100019818	组织工程 Tissue Engineering	2/0.5	44	32	12			4	
	212100008913	分子生物学 Molecular Biology	2	32	32				4	
	212100012018	JAVA 程序设计 JAVA Programming	2/0.5	44	32	12			4	
	212103007713	医学信息学概论 Introduction to Medical Informatics	2	32	32				4	
	210103001513	离散数学 C Discrete Mathematics C	2	32	32				4	
	212103003813	数据结构（B） Data Structure (B)	2	32	32				4	
	212100018018	机器学习 Machine Learning	2/0.5	44	32	12			4	
	212100011918	电子线路设计（电赛课程） Design of Electronic Circuit (Course for Electronic Design Contest)	1/1	40	16	24			4	
	212100011218	虚拟仪器 Virtual Instrument	1/0.5	28	16	12			5	
	212103006513	生物统计学 Biostatistics	2	32	32				5	
	212103001113	临床医学概论 Introduction to Clinical Medicine	2	32	32				5	
	212100013618	机械设计基础 Mechanical Design Foundation	2/0.5	44	32	12			5	
	212100012918	数字系统设计（双语） Digital System Design (Bilingual)	2	32	32				5	
	212100011618	可编程数字系统 Programmable Digital System	1/1	40	16	24			5	
	212100015018	数据库技术与应用 Database Technology and Applications	2/0.5	44	32	12			5	
	212100019218	生物芯片 Biochip	2	32	32				6	

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		
	212100011418	自动控制原理与技术 Automatic Control Theory and Technology	2/0.5	44	32	12			6	
	212100010218	医学人工智能 Medical Artificial Intelligence	2	32	32				6	
	212103002513	智能仪器 Intelligent Instrument	2	32	32				6	
	212100014918	远程医疗与 PACS 系统 Telemedicine and PACS System	1/0.5	28	16	12			6	
	212103007113	医用治疗设备 Medical treatment equipment	2	32	32				6	
	212103006113	医学检验与分析仪器 Medical laboratory and analytical instruments	2	32	32				6	
	212100011018	医学图像处理 Medical Image Processing	2/0.5	44	32	12			6	
	212100020318	微机原理与接口技术 Microcomputer Principles and Interface Technology	2/0.5	44	32	12			6	
	212103001813	生物电子测量（双语） Bioelectronic Measurement (Bilingual)	2	32	32				6	
	212103000813	生物医学信息学（双语） Biomedical Informatics (Bilingual)	2	32	32				6	
	212100016918	医疗器械管理与法规 Medical Device Management and Regulations	2	32	32				6	
	212100020018	生物医学工程伦理与职业规范 Ethics and professional norms of biomedical engineering	2	32	32				7	
	212103002713	生物物理学 Biophysics	2	32	32				7	
	212100011318	机械原理 Mechanical Principle	2/0.5	44	32	12			7	
	212103006013	生物系统的建模与仿真 Simulation and Modeling of Biosystem	2	32	32				7	
	212103002413	生物材料 Biomaterials	2	32	32				7	
	212103001713	生物医学光子学导论 Introduction to Biomedical photonics	2	32	32				7	
专业课程平台选修　26 学分，其中理论 21 学分，实践（实验）5 学分 Demand of Credits: 45.5 (Required 19.5, Elective 26)										

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	备注 Notes
							实践 Exp.	实习 Pra.		
实践 Practice	实践 Course Practice	必修 Compulsory Courses	112110010718	劳动教育 Labor Education	1	36	√		1-7	
			109110000318	军事技能训练 Military Skill Training	2	36	√		1	
		选修 Elective Courses	212110019118	医学临床工程实践 Medical Clinical Engineering Practice	2	2W	√		7	2 选 1
			212110020718	医疗器械工程实践 Medical Device Engineering Practice	2	2W	√		7	
	课程设计 Project Design	必修 Compulsory Course	212110016518	生物医学电子技术课程设计 Course design of biomedical electronic technology	2	2W	√		5	仪器方向选修
			212110021418	医学仪器与系统课程设计 Curriculum design of medical instrument and system	2	2W	√		6	
			212110020618	系统生物医学综合实践 Comprehensive Practice of System Biomedical Science	2	2W	√		5	系统生物医学方向选修
			212110019618	系统生物医学科学实训 System Biomedical Science Training	2	2W	√		6	
	小计 Amount		**必修学分 7，选修学分 2**							
			212110019018	专业认知实习 Professional recognizing practice	1	1W		√	2	
			212110010818	电子实训 Electrical Engineering Training	0/1	1W		√	2	
			701110000418	工程训练 D Engineering training D	2	2W		√	5	
			212110020918	专业实习 Professional Practice	2	2W		√	5	
	毕业实习 Graduation internship	必修 Compulsory Course	01844040	毕业实习 Practice of Graduation Design	2	4W		√	8	
	毕业论文（设计） Graduation Thesis (Project)	必修 Compulsory Course	01845010	毕业论文 Undergraduate Thesis	10	12W	√		8	
	小计 Amount		**必修学分 18**							
学分要求:27（必修学分 25，选修学分 2） Demand of Credits: ×× (Required 23, 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
/	艺术实践 Art Practice	0/1	24			24		1-7
115100000113	就业指导 Employment Guidance	1	16	16				6
/	创新教育 Innovation Education	3	/					
/	创业教育 Entrepreneurship Education	2	/					
小计 Amount		10						
学分要求：必修学分 10 **Demand of Credits: Required 10**								

执笔人：　　审核人：

学院盖章：　　完成日期：

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

医学信息工程专业面向健康中国建设需求，培养具有社会主义核心价值观、社会责任感、中华民族共同体意识，具备坚实的生物医学、工程技术、信息科学、人工智能有关的基础理论知识，较强的工程开发和创新能力、沟通与组织管理能力、知识更新与自我完善能力的理、工、医复合型高级工程技术人才。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，能解决医疗健康领域的复杂工程问题。

毕业五年左右在从业的专业领域达到以下目标要求：

目标 1：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；

目标 2：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；

目标 3：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；

目标 4：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；

目标 5：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 Medical Information Engineering program is designed to meet the demands of building a healthy China. It aims to cultivate advanced engineering and technical professionals with a solid foundation in biomedical science, engineering technology, information science, and artificial intelligence. These individuals should embody the socialist core values, a sense of social responsibility, and awareness of the Chinese national community. The graduates are expected to possess strong capabilities in engineering development, innovation, communication, organizational management, and the ability to continuously update and enhance their knowledge.

Upon graduation, within approximately five years of professional experience, individuals in this field are expected to achieve the following goals:

Objective 1: Possessing a strong foundation in the humanities, engineering professional ethics, and a sense of social responsibility, considering the impact of society, health, safety, law, and culture in engineering practice. Fulfilling engineering responsibilities, fostering a sense of community for the Chinese nation, and contributing to the well-being of the country, regions, and ethnic areas in the field of health care.

Objective 2: When addressing complex engineering problems in the field of medical informatics and related areas, be able to utilize mathematical and natural science principles, apply specialized knowledge in medical informatics engineering, engineering skills, and modern tools to analyze and research problems, and design viable solutions.

Objective 3: In engineering projects within the field of medical informatics

and related areas, possess capabilities in technical development, engineering practice, organizational management, and decision-making. Able to consider factors such as natural, social ethics, and sustainable development, and become a technical cornerstone, key personnel, or organizational leader.

Objective 4: Possess excellent communication and expression abilities, as well as an international perspective, and be able to contribute effectively in multicultural, multidisciplinary, and cross-cultural environments and teams.

Objective 5: Demonstrate awareness of lifelong learning and self-directed learning, stay abreast of the latest theories, technologies, and trends in the field of medical informatics engineering, and possess the ability to continuously adapt to societal development and industry competition.

三、毕业要求

III Basic Requirements for Graduation

1、工程知识：能够将数学、自然科学、工程基础和专业知识用于解决医学信息工程相关的复杂问题。

1-1：掌握数学、自然科学和工程基础知识，能够将其运用到医学信息工程问题的恰当表述中。

1-2：掌握生物医学工程基础理论与专业知识，能够应用于医学信息工程及相关领域内具体工程问题的建模和求解。

1-3：能将相关工程知识及数学模型方法用于推演、分析医学信息工程及相关领域的复杂工程问题。

1-4：具有系统思维的能力，将相关专业知识和数学模型应用于医学信息工程及相关领域复杂工程问题解决方案的比较与综合。

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复杂工程问题，以获得有效结论。

2-1：能够基于数学和自然科学的基本原理，识别医学信息工程领域需要解决的问题，判断其中的关键环节。

2-2：能够基于工程科学的基本原理和数学模型方法，正确表达医学信息工程领域中的工程问题，并认识到解决问题方案的多样性。

2-3：能够运用数学、自然科学和工程科学的基本原理，借助文献研究，分析医学信息工程领域的复杂工程问题，形成分析报告，获得有效结论。

3、设计/开发解决方案：能够设计针对复杂工程问题的解决方案，设计满足特定需求的系统、单元（部件）或工艺流程，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

3-1：掌握医学信息工程及相关领域的系统设计和产品开发的基本方法和技术，能够针对复杂工程问题的设计目标给出技术解决方案。

3-2：能够在解决方案的框架下，针对医学信息工程及相关领域的复杂工程问题，设计满足特定需求的算法、电路、软件或系统。

3-3：能够在工程设计中体现创新意识，综合考虑公共健康与安全、节能减排与环境保护、法律和伦理，以及社会与文化等因素。

4、研究：能够基于科学原理并采用科学方法对医学信息工程专业及相关领域的复杂工程问题进行研究，包括系统设计、数据分析与解释、并通过实验测试结果综合得到合理有效的结论。

4-1：能够基于医学信息工程专业基础理论和科学原理，通过文献研究或相关方法，调研和分析复杂工程问题的解决方案。

4-2：能够根据研究目标，选择合理的研究路线，设计可行的实验方案，采用科学的实验方法，安全规范地开展实验并获取数据。

4-3：能正确分析和解释数据，并通过信息综合得到科学合理有效的结论。

5、使用现代工具：能够针对复杂工程问题，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。

5-1：了解医学信息工程专业常用的现代仪器、信息技术工具、工程工具和模拟软件的使用原理和方法，并理解其局限性。能选择和使用恰当的工具，针对复杂工程问题进行分析、计算和设计。

5-2：能够针对具体的工程问题，通过组合、选配、改进、二次开发等方式创造性地使用现代工具进行模拟和预测，满足特定需求。

6、工程与社会：能够基于医学信息相关背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，

并理解应承担的责任。

6-1：了解医学信息工程专业及相关领域的技术标准体系、知识产权、产业政策与法律法规，理解不同社会文化对工程活动的影响。

6-2：能分析和评价工程实践对社会、健康、安全、法律、文化的影响，并理解应承担的责任。

7、环境和可持续发展：能够理解和评价针对复杂工程问题的工程实践对环境、社会可持续发展的影响。

7-1：了解与医学信息工程相关行业的环境保护、可持续发展等方面的方针、政策和法律、法规。

7-2：理解工程实践中所应承担的责任，能够正确认识并评价工程实践对环境、社会可持续发展的影响，推动民族地区健康发展。

8、职业规范：具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。

8-1：牢固树立中华民族共同体意识，具备健全的人格、较好的人文社会科学素养，有正确价值观，理解个人与社会的关系。

8-2：恪守工程伦理、理解并遵守工程职业道德和规范，尊重国家和国际通行的法律法规。

8-3：在工程实践中，能自觉履行工程师对公众的安全、健康和福祉社会责任，理解和包容多元化的社会需求。

9、个人和团队：能够在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。

9-1：能够在多学科背景下的团队中分工与协作，正确处理个人与团队的关系，承担团队成员的责任，完成相应的任务。

9-2：具备一定的组织管理能力，能制订有效的工作计划，并根据团队成员能力与特长合理地分配工作，协调进度，完成任务。

10、沟通：能够就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。并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

10-1：能够以口头或书面方式清晰准确地表达医学信息工程及相关领域的专

业问题，能与业界同行及社会公众进行有效沟通和交流，能应用现代网络工具进行在线沟通交流。

10-2：能理解不同民族和不同文化的差异，具备跨民族、跨文化背景下沟通和交流的能力。

10-3：具有一定的国际视野，了解生物医学工程及相关领域理论研究与技术发展的国际前沿动态。

11、项目管理：理解并掌握工程管理原理与经济决策方法，并能在多学科环境中应用。

11-1：了解工程管理涉及的问题，掌握工程管理基本原理、经济分析与决策方法。

11-2：能够运用系统工程的观点、理论和方法，在多学科环境中对项目进行管理并解决问题。

12、终身学习：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

12-1：具有自主学习意识，理解终身学习的必要性。

12-2：掌握自主学习的方法和拓展知识、提高能力的途径，具备为适应发展而自我提高的能力。

1、Engineering Knowledge: Capable of applying mathematics, natural sciences, engineering fundamentals, and specialized knowledge to address complex problems in the field of medical informatics engineering.

1-1: Master foundational knowledge in mathematics, natural sciences, and engineering. Apply these appropriately to articulate problems in the field of biomedical engineering.

1-2: Acquire foundational theories and specialized knowledge in biomedical engineering for modeling and solving specific engineering problems in medical informatics and related fields.

1-3: Apply relevant engineering knowledge and mathematical modeling methods to deduce and analyze complex engineering problems in medical informatics and related areas.

1-4: Demonstrate systematic thinking by comparing and integrating relevant

professional knowledge and mathematical models to formulate solutions for complex engineering problems in medical informatics and related fields.

2、Problem Analysis: Proficient in applying the fundamental principles of mathematics, natural sciences, and engineering science to identify, articulate, and analyze complex engineering problems through literature research, leading to the attainment of effective conclusions.

2-1: Identify problems in the field of medical informatics engineering based on basic principles of mathematics and natural sciences, recognizing key aspects.

2-2: Express engineering problems in the field of medical informatics correctly based on the basic principles of engineering science and mathematical modeling. Recognize the diversity of solution approaches.

2-3: Utilize basic principles of mathematics, natural sciences, and engineering science, along with literature research, to analyze complex engineering problems in medical informatics and present analysis reports with valid conclusions.

3、Design/Development of Solutions: Capable of designing solutions for complex engineering problems, creating systems, units (components), or process flows that meet specific requirements. Able to demonstrate innovative thinking in the design process and consider factors such as societal, health, safety, legal, cultural, and environmental aspects.

3-1: Master basic methods and techniques for system design and product development in biomedical engineering and related fields. Provide technical solutions for complex engineering problems in line with design objectives.

3-2: Design algorithms, circuits, software, or systems that meet specific requirements for complex engineering problems in medical informatics and related fields within the framework of solutions.

3-3: Demonstrate innovation in engineering design, considering factors such as public health and safety, energy conservation, environmental protection, legal and ethical aspects, as well as social and cultural factors.

4、Research: Proficient in conducting research on complex engineering problems in the field of medical informatics and related areas based on scientific principles and utilizing scientific methods. This includes activities such as system design, data analysis and interpretation, and synthesizing experimental test results to derive reasonable and effective conclusions.

4-1: Conduct research on complex engineering problems in the field of

medical informatics and related areas based on scientific principles and methods, including system design, data analysis, and interpretation, to obtain reasonable and effective conclusions.

4-2: Investigate and analyze solutions to complex engineering problems through literature research or relevant methods based on foundational theories and scientific principles in medical informatics engineering.

4-3: Analyze and interpret data accurately, obtaining scientifically sound conclusions through comprehensive information synthesis.

5、Using Modern Tools: Proficient in developing, selecting, and utilizing appropriate technologies, resources, modern engineering tools, and information technology tools for complex engineering problems. This includes predicting and simulating complex engineering problems, with an understanding of their limitations.

5-1: Understand the principles and methods of commonly used modern instruments, information technology tools, engineering tools, and simulation software in the field of biomedical engineering. Choose and use appropriate tools for analysis, calculation, and design of complex engineering problems.

5-2: Creatively use modern tools for simulation and prediction in various ways, such as combining, selecting, adapting, or improving, to meet specific needs for solving complex engineering problems.

6、Engineering and Society: Capable of conducting a rational analysis based on background knowledge of medical informatics to evaluate the impact of professional engineering practices and solutions to complex engineering problems on society, health, safety, law, and culture. Understands and accepts associated responsibilities.

6-1: Understand the technical standard system, intellectual property, industry policies, and regulations in medical informatics engineering and related fields. Recognize the influence of different social cultures on engineering activities.

6-2: Analyze and evaluate the impact of engineering practices on society, health, safety, law, culture, and understand the responsibilities that need to be assumed based on knowledge of medical informatics engineering and related backgrounds.

7、Environment and Sustainable Development: Capable of understanding and evaluating the impact of engineering practices on the environment and

social sustainability for complex engineering problems.

7-1: Understand policies, regulations, and laws related to environmental protection and sustainable development in industries relevant to medical informatics engineering.

7-2: Recognize responsibilities in engineering practices, accurately assess the impact of engineering practices on the environment, social sustainability, and promote the healthy development of ethnic regions.

8、Professional Standards: Possesses humanities and social science literacy, a sense of social responsibility, and the ability to understand and adhere to engineering professional ethics and standards, fulfilling responsibilities in engineering practice.

8-1: Firmly establish a sense of community for the Chinese nation, possess a sound character, good humanities and social science literacy, correct values, and understand the relationship between individuals and society.

8-2: Adhere to engineering ethics, understand and comply with professional ethics and standards, and respect national and internationally recognized laws and regulations.

8-3: In engineering practice, consciously fulfill the engineer's responsibility to the safety, health, and well-being of the public, understanding and accommodating diverse social needs.

9、Individual and Team: Capable of taking on roles as an individual, team member, or leader in teams with diverse disciplinary backgrounds.

9-1: Function effectively in teams with diverse disciplinary backgrounds, correctly manage individual and team relationships, take on responsibilities as team members, and complete assigned tasks.

9-2: Possess organizational management skills, develop effective work plans, and reasonably allocate tasks based on the capabilities and strengths of team members, coordinate progress, and accomplish tasks.

10、Communication: Capable of effectively communicating and interacting with peers in the industry and the general public regarding complex engineering problems. This includes writing reports and designing documents, making presentations, expressing thoughts clearly, and responding to instructions. Also possesses a certain international perspective and can communicate in cross-cultural contexts.

10-1: Effectively communicate and interact with peers in the industry and the general public on complex engineering problems, including writing reports and designing documents, making presentations, expressing thoughts clearly, and responding to instructions. Have an international perspective and communicate in cross-cultural contexts.

10-2: Clearly and accurately express professional issues in medical informatics engineering and related fields orally or in writing, communicate effectively with peers in the industry and the general public, and use modern network tools for online communication.

10-3: Understand differences in ethnicity and culture, possess the ability to communicate in cross-ethnic and cross-cultural contexts, and have a certain international perspective, understanding international trends in theoretical research and technological development in biomedical engineering and related fields.

11、Project Management: Understands and masters the principles of engineering management and economic decision-making methods, applying them in a multidisciplinary environment.

11-1: Understand issues related to project management, master basic principles of engineering management, economic analysis, and decision-making methods.

11-2: Apply systems engineering perspectives, theories, and methods to manage projects and solve problems in a multidisciplinary environment.

12、Lifelong Learning: Possesses awareness of self-directed learning and the importance of lifelong learning, with the ability to continuously learn and adapt to developments.

12-1: Demonstrate awareness of self-directed learning and the importance of lifelong learning.

12-2: Master methods of self-directed learning and ways to expand knowledge and enhance capabilities, possessing the ability to self-improve to adapt to development continually.

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	培养目标 1 Cultivation Objective Ⅰ	培养目标 2 Cultivation Objective II	培养目标 3 Cultivation Objective III	培养目标 4 Cultivation Objective Ⅳ	培养目标 5 Cultivation Objective Ⅴ
毕业要求 1 Graduation Requirement I		√			
毕业要求 2 Graduation Requirement II		√			√
毕业要求 3 Graduation Requirement Ⅲ		√	√		√
毕业要求 4 Graduation Requirement Ⅳ		√	√		√
毕业要求 5 Graduation Requirement Ⅴ		√	√		
毕业要求 6 Graduation Requirement Ⅵ	√		√		
毕业要求 7 Graduation Requirement Ⅶ	√		√		
毕业要求 8 Graduation Requirement Ⅷ	√				
毕业要求 9 Graduation Requirement Ⅸ			√	√	
毕业要求 10 Graduation Requirement Ⅹ				√	
毕业要求 11 Graduation Requirement XI			√	√	
毕业要求 12 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 工程与社会 Engineering and Society		7 环境和可持续发展 Environment and Sustainable Development		8 职业规范 Professional norms			9 个人和团队 Individual and Team		10 沟通 Communication			11 项目管理 Project Management		12 终身学习 Lifelong Learning	
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	10.1	10.2	10.3	11.1	11.2	12.1	12.2
英语 English																										M					
思想道德与法治 Moral Education and Rule of Law																				M											
形势与政策 Situation and Policy																		M		M											M
中华民族共同体概论 Education of Chinese Minzu Community Consciousness																				M											
中国近现代史纲要 Essentials of China Modern and Contemporary History																				M											
马克思主义基本原理 Basis Principles of Marxism																				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											

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 工程与社会 Engineering and Society		7 环境和可持续发展 Environment and Sustainable Development		8 职业规范 Professional norms			9 个人和团队 Individual and Team		10 沟通 Communication			11 项目管理 Project Management		12 终身学习 Lifelong Learning	
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	10.1	10.2	10.3	11.1	11.2	12.1	12.2
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																				M											
工程制图 Engineering Drafting	M														L																
线性代数 Linear Algebra	M																														
高等数学 Advanced Mathematics	M																														
复变函数 Complex Function	L																														
概率论与数理统计 Probability Theory and Mathematic Statistics	M																														
C 程序设计及医学应用 C Programming and Medical Applications								L							H																
电路分析 Circuit Analysis			H			M																									
大学物理 College Physics	M																														
大学物理实验 Lab of College Physics		M																													
模拟电子技术实验 Analog Electronic Experiment						M		M							L																
模拟电子技术			H			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 工程与社会 Engineering and Society		7 环境和可持续发展 Environment and Sustainable Development		8 职业规范 Professional norms			9 个人和团队 Individual and Team		10 沟通 Communication			11 项目管理 Project Management		12 终身学习 Lifelong Learning	
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	10.1	10.2	10.3	11.1	11.2	12.1	12.2
Analog Electronic Technology																															
信号与系统 Signal and System		H				M																									
数字电子技术与 EDA 实验 Digital Electronic Technology and EDA Experiment						M		M							L																
数字电子技术 Digital Electronic Technology			H			M																									
生物医学工程导论 Introduction to Biomedical Engineering																H														H	
数据结构（A） Data Structure (A)		H							M																						
数据库原理 Database Principle				H										M																	
信息与编码 Information and Coding		H				M																									
解剖生理学实验 Anatomy and Physiology Experiment										M							L														
解剖生理学 Anatomy and Physiology	H																				L										
生物医学数字信号处理 Biomedical Digital Signal Processing		H										M			L																
医学信息系统 Medical Information System								H			M				M																
劳动教育 Labor Education																				H											

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 工程与社会 Engineering and Society		7 环境和可持续发展 Environment and Sustainable Development		8 职业规范 Professional norms			9 个人和团队 Individual and Team		10 沟通 Communication			11 项目管理 Project Management		12 终身学习 Lifelong Learning	
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	10.1	10.2	10.3	11.1	11.2	12.1	12.2
军事技能训练 Military Skill Training																				L											
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 Electrical Engineering Training															M																
工程训练 A Engineering Training A																	H				H										
专业认知实习 Professional recognizing practice																M		L												M	
专业实习 Professional Practice										M						H			M			M	M						L		
毕业实习 Practice of Graduation Design																	M									H					
毕业论文（设计）Undergraduate Thesis (Project)				M			M		H		H																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、C 程序设计及医学应用 C Programming and Medical Application、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、数据库原理 Database System、数据结构 Data Structure、信息与编码 Information and Coding、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、创新创业活动 Innovation and Entrepreneurship、专业实习 Professional Practice、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	**实践（双创） Practice（I&E Crs.)**	
通识课程平台 General Course Platform	必修 Compulsory	594	25	7	18.82%

<table>
<tr><td colspan="3" rowspan="2">课程类别
Course Classified</td><td rowspan="2">学时/周数
Period/Weeks</td><td colspan="2">学分
Credits</td><td rowspan="2">学分比例
Proportion of Crs.</td></tr>
<tr><td>理论
Theory</td><td>实践（双创）
Practice（I&E Crs.)</td></tr>
<tr><td colspan="2"></td><td>选修
Elective</td><td>144</td><td>9</td><td>0</td><td>5.29%</td></tr>
<tr><td colspan="2">学科基础课程平台
Basic Course Platform</td><td>必修
Compulsory</td><td>920</td><td>41.5</td><td>5</td><td>27.35%</td></tr>
<tr><td colspan="2" rowspan="2">专业课程平台
Major Course Platform</td><td>必修
Compulsory</td><td>376</td><td>16</td><td>4</td><td>11.76%</td></tr>
<tr><td>选修
Elective</td><td>456</td><td>21.5</td><td>4</td><td>15.00%</td></tr>
<tr><td colspan="2" rowspan="2">集中性实践课程平台
Practical Teaching Platform</td><td>必修
Compulsory</td><td>72+26w</td><td>0</td><td>25</td><td rowspan="2">15.88%</td></tr>
<tr><td>选修
Elective</td><td>2w</td><td>0</td><td>2</td></tr>
<tr><td rowspan="2">素质拓展平台
Quality Developme nt Platform</td><td>双创学分
Innovation & Entrepreneursh ip Credits</td><td rowspan="2">必修
Compulsory</td><td>/</td><td>/</td><td>5</td><td>2.94%</td></tr>
<tr><td>其他学分
Other Credits</td><td>92</td><td>4</td><td>1</td><td>2.94%</td></tr>
<tr><td rowspan="2">小计
Amount</td><td colspan="2">必修学分总数
Compulsory Credits</td><td>133.5</td><td>选修学分总数
Elective Credits</td><td>36.5</td><td>选修学分比例
Proportion of Elective Credits</td><td>21.47%</td></tr>
<tr><td colspan="2">理论学分总数
Theory Credits</td><td>117</td><td>实践学分总数
Practice Credits</td><td>48</td><td>实践教学环节比例
Proportion of Internship and Practical Training</td><td>25.29%</td></tr>
<tr><td colspan="3">最低毕业学分
The Lowest Graduate Credits</td><td colspan="5">170</td></tr>
</table>

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				2
225100000118	中华民族共同体概论 Education of Chinese Minzu Community Consciousness	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		3
20W100000813	英语 3 English 3	2	32	32				3
218110015018	体育 3 Physical Education 3	0/0.5	16			16		3
217100012318	马克思主义基本原理 Basis Principles of Marxism	2.5/0.5	52	40		12		4
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		5

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	
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		6
20W100000913	英语 4 English 4	2	32	32				4
218110014718	体育 4 Physical Education 4	0/0.5	16			16		4
218110014018	体育 5 Physical Education 3	0/0.5	16			16		5
218110015318	体育 6 Physical Education 3	0/0.5	16			16		6
208100000613	大学生心理健康 Psychological Health of University Students	1	16	16				1
学分要求：必修学分 32 **Demand of Credits: Required 32**								

注：大学英语扩展课程包括① 20W100000813 英语 3② 20W100000913 英语 4③ 20W100001018 学术英语阅读与写作④ 20W100001318 高级媒体英语视听说⑤ 20W100001518 英语国家社会与文化⑥ 20W100001618 中华文化导论（英文），要求在第 3、4 学期完成 4 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	2
人文素养与写作 Humanistic Accomplishment and Writing	2
科学技术与科普 Science and Technology & Science Popularization	2
艺术体验与审美 Art Appreciation and Aesthetics	1
国际视野与世界 Contemporary China and the World	1
中华文化与文明 Chinese Culture and Civilization	1
学分要求：选修学分 9 **Demand of Credits: Elective 9**	

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 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		
学科基础必修 Basic Courses Required	212100012318	工程制图 Engineering Drafting	2/0.5	44	32	12			1	
	2101000118	线性代数 Linear Algebra	2	48	32			16	1	
	2101000113	高等数学 A(1) Advanced Mathematics A(1)	4	80	64			16	1	
	212100020218	C 程序设计及医学应用 C Programming and Medical Applications	2/1	56	32	24			1	
	210102000413	高等数学 A(2) Advanced Mathematics A(2)	5	96	80			16	2	
	212100012618	电路分析 Circuit Analysis	3.5/0.5	76	56	12	8		2	
	211110021318	大学物理实验(1) Lab of College Physics A(1)	0/0.5	16	0	16			2	
	211100010918	大学物理 A(1) College Physics A(1)	3	56	48			8	2	
	212110010518	模拟电子技术实验 Analog Electronic Experiment	0/1	24	0	24			3	
	212103005213	模拟电子技术 Analog Electronic Technology	3.5	64	56			8	3	
	211110022818	大学物理实验(2) Lab of College Physics A(2)	0/0.5	16	0	16			3	
	211100011018	大学物理 A(2) College Physics A(2)	3	56	48			8	3	
	210102000513	复变函数 Functions of Complex Variable	3	64	48			16	3	
	2101000112	概率论与数理统计 Probability and mathematical statistics	2.5	56	40			16	3	
	212103003613	信号与系统 Signal and System	3.5	64	56			8	4	
	212110010618	数字电子技术与 EDA 实验 Digital Electronic Technology and EDA Experiment	0/1	24	0	24			4	
	212103003313	数字电子技术 Digital Electronic Technology	3.5	64	56			8	4	
	212100022218	工程管理与经济决策 Engineering Management and Economic Decision	1	16	16				4	
学分要求：必修学分 46.5 理论 41.5 实践（实验）5 **Demand of Credits: Required 46.5**										

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		
专业必修 Required Courses	212100013018	生物医学工程导论 Introduction to Biomedical Engineering	1	24	16		8		1	
	212103004713	数据结构（A） Data Structure (A)	2.5/1	64	40	24			3	
	212103002813	数据库原理 Database Principle	2.5/1	64	40	24			4	
	212103003413	信息与编码 Information and Coding	2	32	32				4	
	212113005113	解剖生理学实验 Anatomy and Physiology Experiment	0/1	32	0	32			5	
	212103006213	解剖生理学 Anatomy and Physiology	3.5	64	56			8	5	
	212100014818	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			6	
	专业课程平台必修 20 学分，其中理论 16 学分，实践（实验）4 学分									
专业选修 Elective courses	212103004813	生物医学信息检索（双语） Biomedical Information Retrieval (Bilingual)	1	16	16				6	最低学分要求 25.5 学分，第三、四、五、六、七学期至选修 4、6、2、9、4.5 学分。(At least 25 credits are required during The undergraduate stages, including at least 4/6/2/9/4.5 credits in the semester 3/4/5/6/7.
	212100018718	医用化学 Medical Chemistry	2/0.5	44	32	12			2	
	212110020518	计算机程序设计（竞赛课程） Computer Programming（Course for Programming Contest）	0/1			24			2	
	212100019718	生物化学 Biochemistry	2/1	56	32	24			3	
	212100012118	C++程序设计 C++ Programming	2/0.5	44	32	12			3	

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		
	212110015118	细胞与分子检测实验 Analytic Experiment for Cells and Molecules	0/1	24	0	24			3	
	212100009113	医学细胞生物学 Medical Cell Biology	2	32	32				3	
	212100011818	单片机与嵌入式系统设计（电赛课程） Design of MCU and Embedded System (Course for Electronic Design Contest)	2/0.5	44	32	12			3	
	212103001913	计算机网络 Computer Netware	2	32	32				3	
	212100017718	Python 程序设计	2/0.5	44	32	12			3	
	212100018218	C#程序设计 C# Programming	2.5	44	32	12			4	
	212100011718	嵌入式系统设计 Embedded System Design	2/1	56	32	24			5	
	212100019818	组织工程 Tissue Engineering	2/0.5	48	32	12			4	
	212100008913	分子生物学 Molecular Biology	2	32	32				4	
	212100012018	JAVA 程序设计 JAVA Programming	2/0.5	44	32	12			4	
	210103001513	离散数学 C Discrete Mathematics C	2	32	32				4	
	212100018018	机器学习 Machine Learning	2/0.5	44	32	12			4	
	212100011918	电子线路设计（电赛课程）Design of Electronic Circuit (Course for Electronic Design Contest)	1/1	40	16	24			4	
	212100018818	深度学习 Deep learning	2	36	24	12			5	
	212103004313	医学成像技术与设备 Medical Imaging Technology and Equipment	2.5	40	40				5	
	212103003513	操作系统原理 Principles of Operating System	2	32	32				5	

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		
	212103002913	电路分析（双语） Circuit Analysis (Bilingual)	2	32	32				5	
	212103006513	生物统计学 Biostatistics	2	32	32				5	
	212103001113	临床医学概论 Introduction to Clinical Medicine	2	32	32				5	
	212100011618	可编程数字系统 Programmable Digital System	1/1	40	16	24			5	
	212100013418	生物医学传感器与检测技术 Biomedical Sensors and Detection Technology	2/0.5	44	32	12			6	
	212103004913	数据库技术及应用（双语） Database Technology and its Application (Bilingual)	2	32	32				6	
	212100010418	医学信息决策与支持系统 Medical Information Decision-making and Support System	2	32	32				6	
	212100015518	医学大数据 Medical Big Data	1.5/0.5	36	24	12			6	
	212103001213	软件工程 Software Engineering	1.5/1	48	24	24			6	
	212100013818	网络程序设计 Netware Programming	1/0.5	28	16	12			6	
	212100013918	Windows 程序设计 Windows Programming	1/0.5	28	16	12			6	
	212100014018	Linux 程序设计 Linux Programming	1/0.5	28	16	12			6	
	212100014118	计算机图形学 Computer Graphics	2/0.5	44	32	12			6	
	212100013318	移动 APP 开发与应用 APP Design for Mobile Platform	2/0.5	44	32	12			6	
	212100019218	生物芯片 Biochip	2	32	32				6	
	212100010218	医学人工智能 Medical Artificial Intelligence	2	32	32				6	

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		
	212100014918	远程医疗与 PACS 系统 Telemedicine and PACS System	1/0.5	28	16	12			6	
	212103006113	医学检验与分析仪器 Medical laboratory and analytical instruments	2	32	32				6	
	212100011018	医学图像处理 Medical Image Processing	2/0.5	44	32	12			6	
	212100020318	微机原理与接口技术 Microcomputer Principles and Interface Technology	2/0.5	44	32	12			6	
	212103000813	生物医学信息学（双语） Biomedical Informatics (Bilingual)	2	32	32				6	
	212100016918	医疗器械管理与法规 Medical Device Management and Regulations	2	32	32				6	
	212100020018	生物医学工程伦理与职业规范 Ethics and professional norms of biomedical engineering	2	32	32				7	
	212100020118	医院概论 Introduction to hospital	2	32	32				7	
	212103007813	信息安全 Information Security	2	32	32				7	
	212103001613	数据结构与算法分析（双语） Data Structure and Algorithm Analysis (Bilingual)	2	32	32				7	
	212100014618	用户界面设计 User Interface Design	1/0.5	28	16	12			7	
	212100014718	信息系统分析与设计 Analysis and Design of Information System	1/0.5	28	16	12			7	

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		
	212100012818	软件测试 Software Testing Technology	1/0.5	28	16	12			7	
专业课程平台选修 25.5 学分，其中理论 21.5 学分，实践（实验）4 学分 Demand of Credits: 45.5 (Required 20, Elective 25.5)										

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 Compulsory Courses	112110010718	劳动教育 Labor Education	1	36	√		1-7
			109110000318	军事技能训练 Military Skill Training	2	36	√		1
		选修 Elective Courses	212110019918	医学信息工程实践 Medical information Engineering Practice	2	2W	√		7
			212110019118	医学临床工程实践 Medical Clinical Engineering Practice	2	2W	√		7
	课程设计 Project Design	必修 Compulsory Course	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
		选修 Elective Courses							
	小计 Amount		**学分要求: 9（必修学分 7，选修学分 2） Demand of Credits: 9 (Required 7, Elective 2)**						
实习 internship	专业实习 Course internship	必修 Compulsory Course	212110019018	专业认知实习 Professional recognizing practice	1	1W		√	2
			212110010818	电子实训 Electrical Engineering Training	1	1W		√	2
			701110000118	工程训练 D Engineering training D	2	2W		√	5
			212110020918	专业实习 Professional Practice	2	2W		√	5
	毕业实习 Graduation internship	必修 Compulsory Course	01844040	毕业实习 Practice of Graduation Design	2	4W		√	8

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.	
毕业论文（设计） Graduation Thesis (Project)	必修 Compulsory Course		01845010	毕业论文 Undergraduate Thesis	10	12W			8
小计 Amount			必修学分 18						
学分要求: 27（必修学分 25，选修学分 2） 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
/	艺术实践 Art Practice	0/1	24			24		1-7
115100000113	就业指导 Employment Guidance	1	16	16				6
/	创新教育 Innovation Education	3	/					
/	创业教育 Entrepreneurship Education	2	/					
小计 Amount		10						
学分要求：必修学分 10 Demand of Credits: Required 10								

执笔人：　　审核人：

学院盖章：　　完成日期：

生物医学工程专业（智能医学工程卓越工程师班）本科人才培养方案

Undergraduate Program for Outstanding Engineer Program in Intelligent Medical Engineering of Biomedical Engineering

一、培养规格

I Cultivation Standards

I）学制

Length of Schooling

修业年限：4 年

Duration: 4 years

II）学位

Degree

授予学位：工学学士学位

Degrees conferred: Bachelor of Engineering degree

二、培养目标

II Cultivation Objectives

生物医学工程专业“智能医学工程卓越工程师班”面向“健康中国 2030”的国家重大需求，致力于培养具有家国情怀、中华民族共同体意识及人文关怀意识的复合型卓越人才。具备坚实的生物医学、工程技术、信息科学、人工智能有关的基础理论知识，较强的工程开发和创新能力、沟通与组织管理能力、知识更新与自我完善能力，能在医学相关研究院所、高校、人工智能以及智能医疗相关的企事业单位中从事智能医学仪器研发、智能医学系统搭建、智能医学数据挖掘等科研或管理、服务、教育等工作，或在医学、生物学领域从事精准医疗、智能手术、智能康复、智能检验、智能医学信息处理、远程医疗等相关工作。

学生毕业后 5 年左右达到以下目标：

目标 1：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；

目标 2：在解决智能医学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，应用生物医学工程专业知识、电子技术、计算机技术、人工智能技术和现代工具，针对问题进行分析和研究，并设计出可行的解决方案；

目标 3：具备医疗与健康智能产品设计、智能医学信息处理和医疗大数据挖掘的研究与开发能力，能胜任智能医学工程领域相关企事业的技术负责、经营与管理等工作；

目标 4：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；

目标 5：具有终身学习和自主学习的意识，能跟踪智能医学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 "Outstanding Engineer Program in Intelligent Medical Engineering of Biomedical Engineering" is dedicated to addressing the significant national demand of "Healthy China 2030." The program is committed to cultivating versatile and outstanding talents with a sense of national pride, awareness of the Chinese national community, and a humanistic care consciousness. These talents are expected to possess solid foundational knowledge in biomedical sciences, engineering technology, information science, and artificial intelligence. They should also demonstrate strong capabilities in engineering development and innovation, communication and organizational management, continuous learning, and self-improvement.

Graduates of this program should be capable of engaging in research, management, service, and education in the fields of intelligent medical instrument development, intelligent medical system construction, intelligent medical data mining, and related areas. They may pursue careers in medical research institutes, universities, artificial intelligence, and enterprises involved in intelligent medical technology. Additionally, they can contribute to precision medicine, intelligent surgery, intelligent rehabilitation, intelligent diagnostics, intelligent medical information processing, and remote healthcare in the fields of medicine and

biology.

The program aims for students to achieve the following goals approximately five years after graduation:

Objective 1: Possess a strong foundation in humanities, engineering professional ethics, and a sense of social responsibility. In engineering practice, fully consider the impact of social, health, safety, legal, and cultural factors, fulfill the responsibilities of an engineer, foster a sense of the Chinese national community, and contribute to the health sector at the national, regional, and ethnic levels.

Objective 2: When addressing complex engineering problems in the field of intelligent medical engineering and related areas, apply mathematical and natural science principles. Utilize knowledge from biomedical engineering, electronics, computer technology, artificial intelligence, and modern tools to analyze and research problems and design feasible solutions.

Objective 3: Possess the ability to research and develop intelligent medical products, process intelligent medical information, and mine medical big data. Competent in technical leadership, business operations, and management roles in enterprises related to intelligent medical engineering.

Objective 4: Have effective communication and expression skills, along with an international perspective. Capable of contributing in diverse, multi-ethnic, multidisciplinary, cross-cultural environments, and teams.

Objective 5: Demonstrate awareness of lifelong learning and self-directed learning. Keep abreast of the latest theories, technologies, and trends in the field of intelligent medical engineering, and possess the ability to continuously adapt to societal development and industry competition.

三、毕业要求

III Basic Requirements for Graduation

本专业学生主要学习电路与电子学系列课程、计算机系列课程、医学成像原理与设备、医学图像处理、医学信号与系统等方面的基本理论和基本知识，接受金工、电子工艺等方面的基本训练，掌握医学智能系统和医疗仪器设计、开发、管理、运营等方面的基本能力，具备工程实践能力、科学研究素养、综合素质和创新精神等方面的素质。

本专业毕业生应掌握的知识、具备的能力和素质：

毕业要求 1 工程知识：能够将数学、自然科学、医学、工程基础和人工智能技术等专业知识用于解决智能医学工程领域的复杂工程问题。

毕业要求 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临床医学、智能医学信息处理、智能医学仪器设计与制造过程中出现的复杂工程问题，以获得有效结论。

毕业要求 3 设计/开发解决方案：能够设计针对智能医学领域复杂工程问题的解决方案，设计满足特定需求的诊断和治疗系统，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

毕业要求 4 研究：能够基于科学原理并采用科学方法对智能医学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。

毕业要求 5 使用现代工具：能够针对智能医学领域复杂工程问题，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。

毕业要求 6 工程与社会：能够基于智能医学工程领域相关背景知识进行合理分析，评价工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

毕业要求 7 环境和可持续发展：能够理解和评价针对智能医学领域复杂工程问题的工程实践对环境、社会可持续发展的影响。

毕业要求 8 职业规范：具有人文社会科学素养、社会责任感，能够在智能医学工程专业实践中理解并遵守工程职业道德和规范，履行责任。

毕业要求 9 个人和团队：能够在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。

毕业要求 10 沟通：能够就智能医学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，并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

毕业要求 11 项目管理：理解并掌握工程管理原理与经济决策方法，并能在多学科环境中应用。

毕业要求 12 终身学习：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

This major primarily covers fundamental theories and knowledge in the series of courses related to circuits and electronics, computer science, medical imaging principles and equipment, medical image processing, medical signals and systems. Students also undergo basic training in metalworking, electronic technology, and acquire essential capabilities in the design, development, management, and operation of medical intelligent systems and medical instruments. The program aims to cultivate qualities such as engineering practicality, scientific research literacy, comprehensive skills, and innovation spirit.

Knowledge, abilities, and qualities that graduates of this major should possess:

Graduation Requirement 1 Engineering Knowledge: Apply mathematical, natural science, medical, engineering fundamentals, and artificial intelligence technology to solve complex engineering problems in the field of intelligent medical engineering.

Graduation Requirement 2 Problem Analysis: Apply the basic principles of mathematics, natural science, and engineering science to identify, express, and analyze complex engineering problems in clinical medicine, intelligent medical information processing, and the design and manufacturing of intelligent medical instruments through literature research to obtain effective conclusions.

Graduation Requirement 3 Design/Development of Solutions: Design solutions for complex engineering problems in the field of intelligent medicine, design diagnostic and treatment systems that meet specific requirements, and demonstrate innovative awareness in the design process, considering social, health, safety, legal, cultural, and environmental factors.

Graduation Requirement 4 Research: Conduct research in the field of intelligent medical engineering based on scientific principles and using scientific methods. This includes designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information synthesis.

Graduation Requirement 5 Use of Modern Tool: Ability to develop, select, and use appropriate technologies, resources, modern engineering tools, and information technology tools for complex engineering problems in the field of intelligent medical engineering. This includes predicting and simulating complex

engineering problems and understanding their limitations.

Graduation Requirement 6 Engineering and Society: Ability to conduct a reasonable analysis based on relevant background knowledge in the field of intelligent medical engineering, evaluate the impact of engineering practices and solutions to complex engineering problems on society, health, safety, law, culture, and understand the responsibilities involved.

Graduation Requirement 7 Environment and Sustainable Development: Ability to understand and evaluate the impact of engineering practices on the environment and social sustainability in the face of complex engineering problems in the field of intelligent medical engineering.

Graduation Requirement 8 Professional Standards: Possession of humanities and social science literacy, a sense of social responsibility, and the ability to understand and adhere to engineering professional ethics and standards in the practice of intelligent medical engineering. Fulfillment of responsibilities is expected.

Graduation Requirement 9 Individual and Team: Ability to assume roles as individuals, team members, and leaders in a multidisciplinary team.

Graduation Requirement 10 Communication: Ability to effectively communicate and interact with peers in the industry and the general public on complex engineering problems in the field of intelligent medical engineering. This includes writing reports and design documents, making presentations, expressing oneself clearly, responding to instructions, and having a certain international perspective for communication in cross-cultural contexts.

Graduation Requirement 11 Project Management: Understanding and mastery of engineering management principles and economic decision-making methods, and the ability to apply them in a multidisciplinary environment.

Graduation Requirement 12 Lifelong Learning: Awareness of self-directed learning and lifelong learning, with the ability to continuously learn and adapt to development.

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	培养目标 1 Cultivation Objective I	培养目标 2 Cultivation Objective II	培养目标 3 Cultivation Objective III	培养目标 4 Cultivation Objective IV	培养目标 5 Cultivation Objective V
毕业要求 1 Graduation Requirement I		√			
毕业要求 2 Graduation Requirement II		√			√
毕业要求 3 Graduation Requirement III		√	√		√
毕业要求 4 Graduation Requirement IV		√	√		√
毕业要求 5 Graduation Requirement V		√	√		
毕业要求 6 Graduation Requirement VI	√		√		
毕业要求 7 Graduation Requirement VII	√		√		
毕业要求 8 Graduation Requirement VIII	√				
毕业要求 9 Graduation Requirement IX			√	√	
毕业要求 10 Graduation Requirement X				√	
毕业要求 11 Graduation Requirement XI			√	√	
毕业要求 12 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 工程与社会 Engineering and Society	7 环境和可持续发展 Environment and Sustainable Development	8 职业规范 Professional norms	9 个人和团队 Individual and team	10 沟通 Communication	11 项目管理 Project management	12 终身学习 Lifelong learning
英语 English										M		
思想道德与法治 Moral Education and Rule of Law								M				
形势与政策 Situation and Policy							M	M				M
中华民族共同体概论 Education of Chinese Minzu Community Consciousness								M				
中国近现代史纲要 Essentials of China Modern and Contemporary History								M				
马克思主义基本原理 Basis Principles of Marxism								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				
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								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 工程与社会 Engineering and Society	7 环境和可持续发展 Environment and Sustainable Development	8 职业规范 Professional norms	9 个人和团队 Individual and team	10 沟通 Communication	11 项目管理 Project management	12 终身学习 Lifelong learning
工程制图 Engineering Drafting	M				L							
线性代数 Linear Algebra	M											
高等数学 Advanced Mathematics	M											
复变函数 Complex Function	L											
概率论与数理统计 Probability Theory and Mathematic Statistics	M											
C 程序设计及医学应用 C Programming and Medical Applications			L		H							
电路分析 Circuit Analysis	H	M										
大学物理 College Physics	M											
大学物理实验 Lab of College Physics	M											
模拟电子技术实验 Analog Electronic Experiment		M	M		L							
模拟电子技术 Analog Electronic Technology	H	M										
信号与系统 Signal and System	H	M										
数字电子技术与 EDA 实验 Digital Electronic Technology and EDA Experiment		M	M		L							
数字电子技术 Digital Electronic Technology	H	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 工程与社会 Engineering and Society	7 环境和可持续发展 Environment and Sustainable Development	8 职业规范 Professional norms	9 个人和团队 Individual and team	10 沟通 Communication	11 项目管理 Project management	12 终身学习 Lifelong learning
生物医学工程导论 Introduction to Biomedical Engineering						H	M					H
生物医学传感器 Biomedical Sensors	H		M									
解剖生理学实验 Anatomy and Physiology Experiment			M	M		L						
解剖生理学 Anatomy and Physiology	H							L				
生物医学数字信号处理 Biomedical Digital Signal Processing	H		M		L							
医学信号检测技术与仪器 Medical Signal Detection Technology and Instruments			H	M	M							
机器学习 Machine Learning		H	M		L							
深度学习 Deep Learning		H		M	L							
劳动教育 Labor Education								H				
军事技能训练 Military Skill Training								M				
工程管理与经济决策 Engineering Management and Economic Decision							M				H	
生物医学电子系统课程设计（医疗仪器设计） Course design of Biomedical Electronic Technology （Medical Instrument Design）		M	H		M				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 工程与社会 Engineering and Society	7 环境和可持续发展 Environment and Sustainable Development	8 职业规范 Professional norms	9 个人和团队 Individual and team	10 沟通 Communication	11 项目管理 Project management	12 终身学习 Lifelong learning
智能医学工程课程设计 I（医学信号分析） Intelligent Medical Engineering Course Design I (Medical Signal Analysis)		M	H		M				M		L	
智能医学工程课程设计 II（医学人工智能） Intelligent Medical Engineering Course Design II (Medical Artificial Intelligence)		M	H		M				M		L	
电子实训 Electrical Engineering Training					M					M		
工程训练 A Engineering Training A						H		H				
专业认知实习 Professional recognizing practice						M	L					M
专业实习 I Professional Practice I						H	M	M	M	M		
专业实习 II Professional Practice II						H	M	M	M	M		
毕业实习 Practice of Graduation Design						M		M		H		
毕业论文（设计） Undergraduate Thesis (Project)	M	M	H	H						H		L

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、电路分析 Circuit Analysis、模拟电子技术 Analog Electronic Technology、数字电子技术 Digital Electronic Technology、C 程序设计及医学应用 C Programming and Medical Applications、信号与系统 Signal and System、生物医学数字信号处理 Biomedical Digital Signal Processing、生物医学传感器 Biomedical Sensors、医学信号检测技术与仪器 Medical Signal Detection Technology and Instruments、机器学习 Machine Learning、深度学习 Deep Learning

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、模拟电子技术实验 Analog Electronic Experiment、数字电子技术与 EDA 实验 Digital Electronic Technology and EDA Experiment、 电子实训 Electrical Engineering Practice、生物医学电子系统课程设计(医疗仪器设计）Course Design of Biomedical Electronic System (Medical Instrument Design)、智能医学工程课程设计 I（医学信号分析）Intelligent Medical Engineering Course Design I(Medical Signal Analysis)、智能医学工程课程设计 II（医学人工智能）Intelligent Medical Engineering Course Design II(Medical Artificial Intelligence)、专业实习 I Professional Practice I、专业实习 II Professional Practice II、创新创业活动 Innovation and Entrepreneurship、毕业实习 Practice of Graduation Design、毕业论文（设计）Undergraduate Thesis (Project)

八、学时与学分

VIII Hours/Credits

学时学分构成表

Table of Hours and Credits

<table>
<tr><th colspan="3" rowspan="2">课程类别
Course Classified</th><th rowspan="2">学时/周数
Period/Weeks</th><th colspan="2">学分
Credits</th><th rowspan="2">学分比例
Proportion of Crs.</th></tr>
<tr><th>理论
Theory</th><th>实践（双创）
Practice（I&E Crs.)</th></tr>
<tr><td colspan="2" rowspan="2">通识课程平台
General Course Platform</td><td>必修
Compulsory</td><td>594</td><td>25</td><td>7</td><td>18.82%</td></tr>
<tr><td>选修
Elective</td><td>144</td><td>9</td><td>/</td><td>5.29%</td></tr>
<tr><td colspan="2">学科基础课程平台
Basic Course Platform</td><td>必修
Compulsory</td><td>980</td><td>43.5</td><td>5.5</td><td>28.82%</td></tr>
<tr><td colspan="2" rowspan="2">专业课程平台
Major Course Platform</td><td>必修
Compulsory</td><td>336</td><td>15</td><td>3</td><td>10.59%</td></tr>
<tr><td>选修
Elective</td><td>344</td><td>17</td><td>6</td><td>13.53%</td></tr>
<tr><td colspan="2" rowspan="2">集中性实践课程平台
Practical Teaching Platform</td><td>必修
Compulsory</td><td>72/30W</td><td>0</td><td>27</td><td rowspan="2">17.06%</td></tr>
<tr><td>选修
Elective</td><td>2W</td><td>0</td><td>2</td></tr>
<tr><td rowspan="2">素质拓展平台
Quality Development Platform</td><td>双创学分
Innovation & Entrepreneurship Credits</td><td rowspan="2">必修
Compulsory</td><td>/</td><td>/</td><td>5</td><td>2.94%</td></tr>
<tr><td>其他学分
Other Credits</td><td>92</td><td>4</td><td>1</td><td>2.94%</td></tr>
<tr><td rowspan="2">小计
Amount</td><td colspan="2">必修学分总数
Compulsory Credits</td><td>136</td><td>选修学分总数
Elective Credits</td><td>34</td><td>选修学分比例
Proportion of Elective Credits</td><td>20.00%</td></tr>
<tr><td colspan="2">理论学分总数
Theory Credits</td><td>113.5</td><td>实践学分总数
Practice Credits</td><td>51.5</td><td>实践教学环节比例
Proportion of Internship and Practical Training</td><td>27.35%</td></tr>
<tr><td colspan="3">最低毕业学分
The Lowest Graduate Credits</td><td colspan="4">170</td></tr>
</table>

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 Education of Chinese Minzu Community Consciousness	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		3
20W100000813	英语 3 English 3	2	32	32				3
218110015018	体育 3 Physical Education 3	0/0.5	16			16		3
217100012318	马克思主义基本原理 Basis Principles of Marxism	2.5/0.5	52	40		12		4
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		5

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	
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		6
20W100000913	英语 4 English 4	2	32	32				4
218110014718	体育 4 Physical Education 4	0/0.5	16			16		4
218110014018	体育 5 Physical Education 3	0/0.5	16			16		5
218110015318	体育 6 Physical Education 3	0/0.5	16			16		6
208100000613	大学生心理健康 Psychological Health of University Students	1	16	16				1
学分要求：必修学分 32 **Demand of Credits: Required 32**								

注：大学英语扩展课程包括① 20W100000813 英语 3② 20W100000913 英语 4③ 20W100001018 学术英语阅读与写作④ 20W100001318 高级媒体英语视听说⑤ 20W100001518 英语国家社会与文化⑥ 20W100001618 中华文化导论（英文），要求在第 3、4 学期完成 4 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	2
人文素养与写作 Humanistic Accomplishment and Writing	2
科学技术与科普 Science and Technology & Science Popularization	2
艺术体验与审美 Art Appreciation and Aesthetics	1
国际视野与世界 Contemporary China and the World	1
中华文化与文明 Chinese Culture and Civilization	1
学分要求：选修学分 9 **Demand of Credits: Elective 9**	

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 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		
学科基础必修 Basic Courses Required	212100012318	工程制图 Engineering Drafting	2/0.5	44	32	12			1	
	2101000118	线性代数 Linear Algebra	2	48	32			16	1	
	2101000113	高等数学 A(1) Advanced Mathematics A(1)	4	80	64			16	1	
	212100020218	C 程序设计及医学应用 C Programming and Medical Applications	2/1	56	32	24			1	
	210102000413	高等数学 A(2) Advanced Mathematics A(2)	5	96	80			16	2	
	212100012618	电路分析 Circuit Analysis	3.5/0.5	76	56	12	8		2	
	211110021318	大学物理实验(1) Lab of College Physics A(1)	0/0.5	16	0	16			2	
	211100010918	大学物理 A(1) College Physics A(1)	3	56	48			8	2	
	212110010518	模拟电子技术实验 Analog Electronic Experiment	0/1	32	0	32			3	
	212103005213	模拟电子技术 Analog Electronic Technology	3.5	64	56			8	3	
	211110022818	大学物理实验(2) Lab of College Physics A(2)	0/0.5	16	0	16			3	
	211100011018	大学物理 A(2) College Physics A(2)	3	56	48			8	3	

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		
	210102000513	复变函数 Functions of Complex Variable	3	64	48			16	3	
	2101000112	概率论与数理统计 Probability and mathematical statistics	2.5	56	40			16	3	
	212103003613	信号与系统 Signal and System	3.5	64	56			8	4	
	212113004513	数字电子技术与 EDA 实验 Digital Electronic Technology and EDA Experiment	0/1	32	0	32			4	
	212103003313	数字电子技术 Digital Electronic Technology	3.5	64	56			8	4	
	212100018018	机器学习 Machine Learning	2/0.5	44	32	12			4	
	212100022218	工程管理与经济决策 Engineering Management and Economic Decision	1	16	16				4	
学分要求：必修学分 49 **Demand of Credits: Required 49**										

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		
专业必修 Required Courses	212100013018	生物医学工程导论 Introduction to Biomedical Engineering	1	24	16		8		1	
	212100013518	生物医学传感器 Biomedical Sensors	2.5/0.5	52	40	12			4	
	212100018818	深度学习 Deep Learning	1.5/0.5	36	24	12			5	
	212113005113	解剖生理学实验 Anatomy and Physiology Experiment	0/1	32	0	32			5	
	212103006213	解剖生理学 Anatomy and Physiology	3.5	64	56			8	5	
	212100014818	生物医学数字信号处理 Biomedical Digital Signal Processing	3/0.5	60	48	12			5	
	212100018918	医学信号检测技术与仪器 Medical Signal Detection Technology and Instruments	3.5/0.5	68	56	12			5	
专业选修 Elective courses	212110020518	计算机程序设计（竞赛课程） Computer Programming（Course for Programming Contest）	0/1			24			2	
	212103004813	生物医学信息检索（双语） Biomedical Information Retrieval (Bilingual)	1	16	16				6	
	212100018718	医用化学 Medical Chemistry	2/0.5	44	32	12			2	
	212100017518	智能医学工程概论 Introduction to Intelligent Medical Engineering	2	32	32				3	
	212100011218	虚拟仪器 Virtual Instrument	1/0.5	28	16	12			3	

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		
	212100019718	生物化学 Biochemistry	2/1	56	32	24			3	
	212100012118	C++程序设计 C++ Programming	2/0.5	44	32	12			3	
	212110015118	细胞与分子检测实验 Analytic Experiment for Cells and Molecules	0/1	24	0	24			3	
	212100009113	医学细胞生物学 Medical Cell Biology	2	32	32				3	
	212100011818	单片机与嵌入式系统设计（电赛课程） Design of MCU and Embedded System (Course for Electronic Design Contest)	2/0.5	44	32	12			3	
	212103001913	计算机网络 Computer Netware	2	32	32				3	
	212100017718	Python 程序设计 Python Programming	2/0.5	44	32	12			3	
	212100019318	大数据分析 Big Data Analysis	1.5/0.5	36	24	12			4	
	212100019818	组织工程 Tissue Engineering	2/0.5	48	32	12			4	
	212100008913	分子生物学 Molecular Biology	2	32	32				4	
	212100012018	JAVA 程序设计 JAVA Programming	2/0.5	44	32	12			4	
	210103001513	离散数学 C Discrete Mathematics C	2	32	32				4	
	212103003813	数据结构（B） Data Structure (B)	2	32	32				4	
	212100011918	电子线路设计（电赛课程）Design of Electronic Circuit (Course for Electronic Design Contest)	1/1	40	16	24			4	
	212100011718	嵌入式系统 Embedded System	2/1	56	32	24			4	
	212103007713	医学信息学概论 Introduction to Medical Informatics	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		
	212103004313	医学成像技术与设备 Medical Imaging Technology and Equipment	2.5	40	40				5	
	212100017318	移动医疗 APP 开发与应用 Mobile Medical APP Development and Application	2/0.5	32	32	12			5	
	212103006513	生物统计学 Biostatistics	2	32	32				5	
	212103001113	临床医学概论 Introduction to Clinical Medicine	2	32	32				5	
	212100013618	机械设计基础 Mechanical Design Foundation	2/0.5	44	32	12			5	
	212100012918	数字系统设计（双语） Digital System Design (Bilingual)	2	32	32				5	
	212100011618	可编程数字系统 Programmable Digital System	1/1	40	16	24			5	
	212100015018	数据库技术与应用 Database Technology and Applications	2/0.5	44	32	12			5	
	212100017218	计算机视觉 Computer Vision Technology	2/0.5	44	32	12			6	
	212100019518	自然语言处理 Natural Language Pro cessing	1.5/0.5	36	24	12			6	
	212100019218	生物芯片 Biochip	2	32	32				6	
	212100011418	自动控制原理与技术 Automatic Control Theory and Technology	2/0.5	44	32	12			6	
	212103002513	智能仪器 Intelligent Instrument	2	32	32				6	
	212100014918	远程医疗与 PACS 系统 Telemedicine and PACS System	1/0.5	28	16	12			6	
	212103007113	医用治疗设备 Medical treatment equipment	2	32	32				6	

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		
	212103006113	医学检验与分析仪器 Medical laboratory and analytical instruments	2	32	32			6	6	
	212100011018	医学图像处理 Medical Image Processing	2/0.5	44	32	12			6	
	212100020318	微机原理与接口技术 Microcomputer Principles and Interface Technology	2/0.5	44	32	12			6	
	212103001813	生物电子测量（双语） Bioelectronic Measurement （Bilingual）	2	32	32				6	
	212103000813	生物医学信息学（双语） Biomedical Informatics （Bilingual）	2	32	32				6	
	212100016918	医疗器械管理与法规 Medical Device Management and Regulations	2	32	32				6	
	212100020018	生物医学工程伦理与职业规范 Ethics and professional norms of biomedical engineering	2	32	32				7	
	212103002713	生物物理学 Biophysics	2	32	32				7	
	212100011318	机械原理 Mechanical Principle	2/0.5	44	32	12			7	
	212103006013	生物系统的建模与仿真 Simulation and Modeling of Biosystem	2	32	32				7	
	212103002413	生物材料 Biomaterials	2	32	32				7	
	212103001713	生物医学光子学导论 Introduction to biomedical photonics	2	32	32				7	
学分要求: 41 (其中必修学分 18，选修学分 23) **Demand of Credits: 41 (Required 18, Elective 23)**										

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 Compulsory Courses	112110010718	劳动教育 Labor Education	1	36	√		1-7
			109110000318	军事技能训练 Military Skill Training	2	36	√		1
		选修 Elective Courses	212110019118	医学临床工程实践 Medical Clinical Engineering Practice	2	2W	√		7
			212110020718	医疗器械工程实践 Medical Device Engineering Practice	2	2W	√		7
	课程设计 Project Design	必修 Compulsory Course	212110019418	生物医学电子系统课程设计(医疗仪器设计） Course Design of Biomedical Electronic System (Medical Instrument Design)	2	2W			4
			212110020418	智能医学工程课程设计 I（医学信号分析） Intelligent Medical Engineering Course Design I (Medical Signal Analysis)	2	2W			5
			212110021018	智能医学工程课程设计 II（医学人工智能） Intelligent Medical Engineering Course Design II (Medical Artificial Intelligence)	2	2W			6
	小计 Amount		**必修学分 9，选修学分 2**						
实习 internship	专业实习 Course internship	必修 Compulsory Course	212110019018	专业认知实习 Professional recognizing practice	1	1W			2
			212110010818	电子实训 Electrical Engineering Training	0/1	1W			2
			701110000118	工程训练 D Engineering training D	2	2W			5
			212110021618	专业实习 I Professional Practice I	1	1W			4
			212110021318	专业实习 II Professional Practice II	1	1w			5
	毕业实习 Graduation internship	必修 Compulsory Course	01844040	毕业实习 Practice of Graduation Design	2	4W			8

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.	
	毕业论文（设计） Graduation Thesis (Project)	必修 Compulsory Course	01845010	毕业论文 Undergraduate Thesis	10	12W			8
	小计 Amount		必修学分 18						
学分要求: 29（必修学分 27，选修学分 2） Demand of Credits: 27 (Required25, 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
/	艺术实践 Art Practice	0/1	24			24		1-7
115100000113	就业指导 Employment Guidance	1	16	16				6（四年制） 8（五年制）
/	创新教育 Innovation Education	3	/					
/	创业教育 Entrepreneurship Education	2	/					
小计 Amount		10						
学分要求：必修学分 10 Demand of Credits: Required 10								

执笔人：　　审核人：

学院盖章：　　完成日期：