**附件一：培养计划（中文）**

**生命信息与仪器工程学院**

## 学科：生物医学工程 代码：0831

## **培养目标**

**本专业培养生物医学工程学科的高级专门人才，研究生通过系统的课程学习和课题研究，学习和掌握马列主义、毛泽东思想、邓小平理论和“三个代表”重要思想，贯彻落实科学发展观，诚信公正，有社会责任感。掌握本学科专业系统的基础理论知识和坚实的专业知识，熟练地掌握一门外国语。具备综合运用生物医学、信息技术、生物材料技术及检测技术解决医学健康领域科学和工程实际问题的知识结构和能力，在生物医学信息、生物制造、脑认知、生物医学仪器等方面开展研究。可胜任本专业或相关专业的教学、科研、工程技术和技术管理工作，并具备进一步深造的学术基础。**

**二、专业设置及研究方向**

**生物医学工程  ①生物医学信息学与影像工程**

**②生物材料及生物制造**

**③神经电生理及脑认知**

**④生物医学传感技术与仪器**

**三、学习年限**

**本学科学制为2.5年，其中课程学习时间一般为1年，学术型硕士参加科研、撰写学位论文和论文答辩的时间为1.5年。**

**四、培养方式与原则**

**1、**学习各环节的设置与安排及学分要求

（1）课程学习时间为2学期。课程设置由学位课、非学位课和必修环节组成。学位课包括公共学位课、专业基础学位课、专业必修学位课三类；非学位课包括专业选修课和全校公共选修课两类。硕士研究生在课程学习阶段至少应修满28学分，其中**学位课23学分，非学位课4-6学分，必修环节1学分，但**一般不超过33学分。

（2）本学科允许学生在导师指导下，跨学科选修专业基础学位课、专业必修学位课、专业选修课，所修学分可以计算作本学科培养方案选修课（含专业选修课和全校公选课）学分。

（3）本学科允许学生在导师指导下，在本学科培养方案内多选修专业学位课（专业基础课、专业必修课），所修学分可以计算作本学科培养方案选修课（含专业选修课和全校公选课）学分。

2、导师负责制与培养要求

研究生的培养实行导师负责制，鼓励以导师为主的指导小组集体培养。课程学习实行学分制，在导师指导下按照本学科的培养方案要求选修课程并制定培养计划。研究生的科研、论文工作要做到理论与实际相结合。

1. **其他**

**按学校规定执行。**

五、课程设置(083100)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 类 别 | | 课程编号 | 开课  学院 | 课 程 名 称 | 总学时 | 学分 | 开课学期及周学时数 | | | | 考核方式 | 授课教师 | 备注 |
| 一 | 二 | 三 | 四 |
| 学位课 | 公共课 | 1 | 马克思 | 中国特色社会主义理论与实践研究 | 32 | 2 | 2 |  |  |  | 考试 |  |  |
| 2 | 外国语 | 第一外国语 | 48 | 3 | 3 |  |  |  | 考试 |  |  |
| 专业基础课 | 1 | 生仪 | 应用统计学 | 48 | 3 | 3 |  |  |  | 考试 | 范明 |  |
| 2 | 法方 | 数字信号处理 | 32 | 2 | 2 |  |  |  | 考试 | 法方 |  |
| 专业必修课 | 1 | 法方 | 人体行为量化 | 32 | 2 |  | 2 |  |  | 考试 | 法方 |  |
| 2 | 生仪 | 模式识别 | 48 | 3 |  | 3 |  |  | 考试 | 陈丰农 |
| 3 | 法方 | 神经工程 | 32 | 2 | 2 |  |  |  | 考试 | 法方 |
| 4 | 法方 | 生物技术 | 32 | 2 |  | 2 |  |  | 考试 | 法方 |
| 5 | 法方 | 神经科学 | 32 | 2 |  | 2 |  |  | 考试 | 法方 |
| 6 | 法方 | 生物医学概论 | 32 | 2 | 2 |  |  |  | 考试 | 法方 |
| 学位课应修 | | | 23学分 | | | | | | | | | |
| 非学位课 | 专业选修课 | 1 | 自动化 | 应用泛函分析 | 48 | 3 | 3 |  |  |  | 考试 | 刘伟峰 |  |
| 2 | 生仪 | 医疗仪器注册与法规 | 16 | 1 |  | 1 |  |  | 考查 | 沈洁 |  |
| 3 | 生仪 | 生物材料 | 32 | 2 | 2 |  |  |  | 考查 | 徐铭恩/ 葛亚坤 |  |
| 4 | 生仪 | 数据挖掘 | 32 | 2 | 2 |  |  |  | 考查 | 徐涛 |  |
| 5 | 生仪 | 生物信息学 | 32 | 2 |  | 2 |  |  | 考查 | 范明 |  |
| 6 | 生仪 | 医学仪器 | 32 | 2 |  | 2 |  |  | 考查 | 刘珂舟 |  |
| 7 | 生仪 | 生物医学检测技术 | 32 | 2 |  | 2 |  |  | 考查 | 崔静洁/李杜娟 |  |
| 8 | 生仪 | 医学图象处理 | 32 | 2 | 2 |  |  |  | 考查 | 徐伟栋/李轶 |  |
| 9 | 生仪 | 软件工程 | 32 | 2 |  | 2 |  |  | 考查 | 李轶 |  |
| 10 | 生仪 | 机器视觉 | 48 | 3 |  | 3 |  |  | 考查 | 陈丰农 |  |
| 11 | 生仪 | 嵌入式系统 | 32 | 2 |  | 2 |  |  | 考查 | 黄爱爱/薛凌云 |  |
| 应修 | |  | 2-4学分 | | | | | |  |  | |
| 1 | 外国语 | 英语听说 | 32 | 1 | 2 | 2 |  |  | 考查 |  |  |
| 2 | 外国语 | 第二外国语 | 32 | 1 | 2 | 2 |  |  | 考查 |  |  |
| 3 | 图书馆 | 科技文献检索 | 16 | 1 | 2 | 2 |  |  | 考查 |  |  |
| 4 | 管理 | 企业运营管理 | 16 | 1 | 2 | 2 |  |  | 考查 |  |  |
| 5 | 经济 | 知识产权 | 16 | 1 | 2 | 2 |  |  | 考查 |  |  |
| 6 | 体艺部 | 体育 | 32 | 1 | 2 | 2 |  |  | 考查 |  |  |
| 应修 | | 2学分 | | | | | | | | | |
| 非学位课应修 | | | 4-6学分 | | | | | | | | | |
| 必修环节 | | | | 文献选读与开题报告 |  | 1 |  | ▲ | ▲ |  |  |  | |
| 应修 | 1学分 | | | | | | | | |
| 合计应修 | | | | 28-30学分 | | | | | | | | | |

1. 引进的专业核心课程占全部专业核心课程比例：6/8=75%

2. 引进的外方课程占全部课程的比例：6/15=40%

3. 外国教师担负的专业核心课程的门数占中外合作办学项目全部课程的比例：6/15=40%

4. 外方教师担负的专业核心课程教学时数占全部教学时数的比例: 6\*32/496=38.7%

**六、学位论**文

**1、学位论文要求（含对论文质量和格式的要求）**

研究生要在导师指导下开展论文工作，论文实际工作时间应不少于1年。并按规定完成文献综述、开题报告、中期检查等环节，并提交书面报告。发现问题及时处理和上报。论文工作要使硕士生在科学研究方面受到较全面的训练，完成硕士论文研究任务一项，培养从事科学研究或独立担负专门技术工作的能力，并以书面形式提供具有一定理论、实践水平的学位论文。

2、发表论文等科技工作要求

按学校规定执行。

1. **论文选题与开题**

学位论文的选题应当对经济建设或在学术理论上有实际意义，尽量结合导师及相关单位的科研任务进行，具有一定先进性、创新性，课题的难易程度和工作量要适当。研究生应在导师指导下，尽早制定学位论文工作计划。一般要求在第3学期末之前完成开题报告会，报告会由本学科和相关学科5名以上的专家参加，经开题报告会认可后，开题报告书及论文工作计划表各1份于第4学期3月底前报研究生学院备案。

1. **论文答辩**

硕士学位论文在答辩之前应先进行论文盲审，盲审通过后可向学院提出答辩申请，论文答辩时间一般应在每年的3月底之前完成。答辩委员会一般由5至7名具有副高以上职称的同行专家组成，其中至少1名校外专家。答辩委员会根据答辩人的报告，就是否同意建议授予答辩人硕士学位以无记名投票方式进行表决，并评定成绩。

**5、毕业与学位授予**

按学校规定执行。

1. 其他

上述六点未涉及到的，按学校规定执行。

**附件二：培养计划（英文）**

**College of Life Information Science & Instrument Engineering**

**Discipline: Biomedical Engineering Code: 0831**

1. **Training Objectives**

**The program is aimed to prepare students as senior professionals in the discipline of Biomedical Engineering. Students will be provided with the highest quality graduate education in biomedicine, information technology, biomaterial technology and detection technology, necessary for problem solving and critical thinking. Student will also be trained to conduct original biomedical research involving biomedical informatics, bio-fabrication, brain cognition, and biomedical instrumentation, etc. The program prepares students for a career in teaching, research, engineering, and technology management, or for pursuing further graduate studies in a related field.**

1. **Major and Research Directions**

**Biomedical Engineering**

**①Biomedical Informatics and Image Engineering**

**②Bio-materials and bio-fabrication**

**③**Brain Processes and Neuroengineering

**④Biomedical Sensing Technology and Instrumentation**

1. **Duration of Study**

**The duration of study is 2.5 years, of which course study time is generally 1 year; time period for participating in academic master's research, dissertation writing and thesis defense is 1.5 years.**

1. **Training Methods and Principles**
2. **Setting arrangements of study stages and credit requirements**

（1）Course study time is 2 semesters. Curriculum is composed by Master’s Degree Course, Non-Master’s Degree Course, and Core Course. Master’s Degree courses includes Common Course, Specialized Basic Course, and Specialized Core Course ; Non-Master’s Degree Course includes Specialized Elective Course and Common Elective Course. Master students must complete at least 28 units but no more than 33 units, among which 23 units of Master’s Degree courses, 4-6 units of Non-Master’s Degree Courses, 1 units of Required Procedure Courses.

（2）With the mentor’s permission, students are allowed to take Specialized Basic Course, and Specialized Core Course; Specialized Elective Course interdisciplinary. The units can be calculated as elective units of this discipline (including Specialized Elective Course and Common Elective Course).

（3）With the mentor’s permission, students are allowed to take more units of Master’s Degree Course (Specialized Basic Course, and Specialized Core Course). The units can be calculated as elective units of this discipline (including Specialized Elective Course and Common Elective Course) .

**2) Mentor accountability and training requirements**

**Mentors are responsible for the training of graduate students. Mentor leading group training is encouraged. Course study is unit based. Under the guidance of mentors, students select courses according to the training requirements, and make training plans. Graduate research, thesis work must show a combination of theory and practice.**

**3) Others**

**See the school regulations.**

1. **Curriculum(083100)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Type | | Names of Courses | | | | | Class  Hours | Credits | Semester | | | | Method of Assessment | Notes |
| 1 | 2 | 3 | 4 |
| Master’s Degree Course | Common Course | Research on Theory and Practice of Socialism with Chinese Characteristics Characteristics | | | | | 32 | 2 | 2 |  |  |  | Exam |  |
| English | | | | | 48 | 3 | 3 |  |  |  | Exam |  |
| Specialized Basic Course | Applied Statistics | | | | | 48 | 3 | 3 |  |  |  | Exam |  |
| Digital Signal Processing | | | | | 32 | 2 | 2 |  |  |  | Exam |  |
| Specialized Core Course | Quantification of human behaviors | | | | | 32 | 2 |  | 2 |  |  | Exam |  |
| Pattern Recognition | | | | | 48 | 3 |  | 3 |  |  | Exam |  |
| Neural Engineering | | | | | 32 | 2 | 2 |  |  |  | Exam |  |
| Biotechnology | | | | | 32 | 2 |  | 2 |  |  | Exam |  |
| Neuroscience | | | | | 32 | 2 |  | 2 |  |  | Exam |  |
| Introduction to Biomedicine | | | | | 32 | 2 | 2 |  |  |  | Exam |  |
| Required Credits | | | 23 | | | | | | | | | | |
| Non-Master’s Degree Course | Specialized Elective Course | Applied Functional Analysis | | | | | 48 | 3 | 3 |  |  |  | Exam |  |
| Registration and Regulation of Medical Devices | | | | | 16 | 1 |  | 1 |  |  | Test |  |
| Bio-materials | | | | | 32 | 2 | 2 |  |  |  | Test |  |
| Data Mining | | | | | 32 | 2 | 2 |  |  |  | Test |  |
| Bioinformatics | | | | | 32 | 2 |  | 2 |  |  | Test |  |
| Medical Instruments | | | | | 32 | 2 |  | 2 |  |  | Test |  |
| Biomedical Detection Technology | | | | | 32 | 2 |  | 2 |  |  | Test |  |
| Medical Image Processing | | | | | 32 | 2 | 2 |  |  |  | Test |  |
| Software Engineering | | | | | 32 | 2 |  | 2 |  |  | Test |  |
| Machine Vision | | | | | 48 | 3 |  | 3 |  |  | Test |  |
| Embedded Systems | | | | | 32 | 2 |  | 2 |  |  | Test |  |
|  | | | | |  |  |  |  |  |  |  |  |
|  | | | | |  |  |  |  |  |  |  |  |
| Required Credits | | | 2-4 | | | | | | | | | |
| English Speaking & Listening | | | | | 32 | 1 | 2 | 2 |  |  | Test |  |
| Second Foreign Language | | | | | 32 | 1 | 2 | 2 |  |  | Test |  |
| Scientific Index Search | | | | | 16 | 1 | 2 | 2 |  |  | Test |  |
| Enterprise Management | | | | | 16 | 1 | 2 | 2 |  |  | Test |  |
| Intellectual Property | | | | | 16 | 1 | 2 | 2 |  |  | Test |  |
| PE | | | | | 32 | 1 | 2 | 2 |  |  | Test |  |
|  | | | | |  |  |  |  |  |  | Test |  |
|  | | | | |  |  |  |  |  |  | Test |  |
| Required Credits | | | | 2 | | | | | | | | |
| Required Credits | | 4-6 | | | | | | | | | | | |
| Required Procedure | | | Literature Survey and Thesis Proposal | | | |  | 1 |  | ▲ | ▲ |  | Test |  |
| Required Credits | | | | 1 | | | | | | | |
| Total Credits | | | 28-30 | | | | | | | | | | | |

1. The major core courses delivered from Paris Descartes University take 6/8=75% of all of the major core courses (8) in the program;
2. The major courses delivered from Paris Descartes University take 6/15=40% of all the courses;
3. The major core courses delivered by the teachers from Paris Descartes University take 6/15=40% of all courses;
4. The major core courses hours taught by the teachers from Paris Descartes University take 6\*32/496=38.7% of all the courses.
5. **Degree Thesis**
6. **Thesis requirements (including the requirements for quality and format)**

Graduate students should start thesis work under the guidance of the mentors. Actual working time on thesis should be no less than 1 year. Literature review, opening report, mid-term examination and other sectors, should be completed in accordance with regulations and submitted with a written report. Problems should be timely identified and reported. The aim of thesis work is to provide comprehensive training to master students in scientific research, to require students to complete thesis research tasks, to help students gain the capacity in independent research work and come up with thesis paper valuable in theory and in practice.

1. **Requirements for research work such as thesis paper**

See the school regulations.

1. **Thesis topic selection and opening**

**Thesis topic should have practical significance on the economy or the academic theory, better intercross with mentor’s research task. The topic should be advanced, innovative, and to the appropriate degree of difficulty and workload. Graduate students should make the thesis work plan as soon as possible, under the mentors’ guidance. Generally the opening report should be completed before the end of the 3rd semester. The opening report meeting needs at least 5 experts to participate. After approval, one copy of the opening report and the thesis work schedule should be submitted to the Graduate School for record before the end of March, during the 4th semester.**

1. **Thesis defense**

Master's thesis should be blind-screened before the defense. Students can send the request for defense to **the Graduate School** after passing the blind-screening. Thesis defense should normally be completed before the end of March each year. Defense committee generally consists of 5-7 experts with associate professor title or above, of which at least one expert is from outside of the school. According to the student's defense report, committee decides on whether they agree to grant the master's degree by secret ballot, and assesses the performance.

1. **Graduation and degree-granting**

**See the school regulations.**

1. **Others**

For those not mentioned above, **see the school regulations.**