**《专业实习（生物医学工程）》课程教学大纲（2020版）**

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| 课程基本信息（Course Information） | | | | | | | | | | | |
| 课程代码（Course Code） | BI498 | | | \*学时（Credit Hours） | | 64 | | | \*学分（Credits） | 4 | |
| \*课程名称（Course Name） | 专业实习（生物医学工程） | | | | | | | | | | |
| Professional Internship (biomedical engineering) | | | | | | | | | | |
| 课程类型 (Course Type) | 专业必修课 | | | | | | | | | | |
| 授课对象（Target Audience） | 大三本科生 | | | | | | | | | | |
| 授课语言 (Language of Instruction) | 中文 | | | | | | | | | | |
| \*开课院系（School） | 生物医学工程学院(School of Biomedical Engineering) | | | | | | | | | | |
| 先修课程（Prerequisite） | 解剖与生理(1, 2)(Anatomy and Physiology: I and II) | | | | | | | | | | |
| \*课程负责人（Instructor） | 隋晓红  (Xiaohong Sui) | | | | 课程网址  (Course Webpage) | | |  | | |  |
| \*课程简介（中文）（Description） | 生物医学工程专业实习属于专业实践类课程，依托上海交通大学附属上海市第六人民医院，由临床医学院统筹安排本科生进行各个科室临床工作的理论与实践学习。在为期两周的专业实习过程中，上午各科室主任进行理论授课，下午同学们进行临床工作参观学习，深入了解生物医疗仪器的工作原理、临床使用方法以及存在的不足之处，从而有效地实现了理性与感性认识的结合。选课同学需要撰写每日实习报告，实习小结。在实习结束后，同学们需要自行提出感兴趣的临床相关的生物医学工程问题，并给出拟定的解决方法。通过该系统的专业实习不仅能够加深同学们对生物医学工程专业及其与临床紧密结合的感性认识与理解，而且促进了其对开发具有我国自主知识产权的生物医疗仪器的迫切愿望与决心。 | | | | | | | | | | |
| \*课程简介（英文）（Description） | Professional Internship is one of the professional practice courses in Biomedical Engineering. The junior undergraduates are required to participate in the theoretical and practical studies arranged by Clinical School of Medicine in Shanghai Jiao Tong University affiliated 6th Hospital of Shanghai. During this two-week internship, directors present the theoretical knowledge about medical instruments from different departments in the morning, and students visit the corresponding clinical work in the afternoon. The internship provides a valuable opportunity to master the principles of medical instruments, clinical manipulation methods and potential shortcomings. Daily internship reports, summary, and a project are required to be presented. This project is selected based on a specific biomedical engineering-related problem occurring clinically. This professional internship can not only enhance the students’ perceptual recognition and understanding of the close relationship between Biomedical Engineering specialty and clinical applications, but also greatly promote their wishes and determination to develop high-end biomedical instruments with Chinese autonomous intellectual properties. | | | | | | | | | | |
| 课程目标与内容（Course objectives and contents） | | | | | | | | | | | |
| \*课程目标 (Course Object) | 1. Describe what and how medical devices are used at a clinical department. [A2, A3]  2. Understand safety, ethics, cost and other constraints in designing a medical device. [D3, D5]  3. Identify a biomedical engineering problem in the hospital and to collaboratively provide a solution in a clear, concise and informative written form. [B3, C2] | | | | | | | | | | |
| 毕业要求指标点与课程目标的对应关系 | 课程目标 | | | | | 毕业要求指标点 | | | | | |
| 课程目标1 | | | | | 毕业要求6 | | | | | |
| 课程目标2 | | | | | 毕业要求1,5,7,9 | | | | | |
| 课程目标3 | | | | | 毕业要求6,7,10 | | | | | |
| \*教学内容进度安排及对应课程目标 (Class Schedule & Requirements & Course Objectives) | 章节 | 教学内容（要点） | 教学目标 | 学时 | | 教学形式 | 作业及考核要求 | | 课程思政融入点 | 对应课程目标 | |
| 教学内容 | 学时 | 教学方式 | 作业及要求 | | 基本要求 | 考查方式 | | 教学内容 | 学时 | |
| 外科学/ICU手术室 (Surgery /ICU Monitoring Room) | 6 | 课堂/临床参观 | 了解外科学的发展史、ICU监护室的各种医疗设备 | | 外科学的基本概念与ICU监护室的监护指标 | 出勤率、每日实习报告、个人实习小结、项目报告 | | 外科学/ICU手术室 (Surgery /ICU Monitoring Room) | 6 | |
| 呼吸疾病/肺功能测定室 (Respiration Disease/Pulmonary Function Testing) | 6 | 同上 | 肺功能测定方法 | | 肺功能测定方法 | 同上 | | 呼吸疾病/肺功能测定室 (Respiration Disease/Pulmonary Function Testing) | 6 | |
| PET、CT、SPECT/核医学科(Nuclear Medicine) | 6 | 同上 | PET、SPECT、CT医疗仪器 | | PET, SPECT, CT的工作原理 | 同上 | | PET、CT、SPECT/核医学科(Nuclear Medicine) | 6 | |
| 血透治疗/血透室(Hemodialysis) | 6 | 同上 | 血透治疗的原理、血透机的使用方法 | | 血透的基本原理与仪器构成 | 同上 | | 血透治疗/血透室(Hemodialysis) | 6 | |
| 检验诊断/检验科(Clinical Laboratory) | 6 | 同上 | 微生物基本原理，检验方法 | | 基本的检验原理与方法 | 同上 | | 检验诊断/检验科(Clinical Laboratory) | 6 | |
| 注1：建议按照教学周周学时编排，以便自动生成教学日历。  注2：相应章节的课程思政融入点根据实际情况填写。 | | | | | | | | | | |
| 课程目标达成度评价 | 课程目标  考核方式 | | | 平时作业(20分) | | 课程项目 (30分) | 期末考试 （50分） | | 课程目标权重 | 课程目标达成度 | |
| 见附表 | | |  | |  |  | |  |  | |
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| \*考核方式 (Grading) | （成绩构成）出席率(Attendance) 10%，每日实习表现记录(Daily activity recording) 20%，个人实习小结(Brief summary of what have learnt in the internship) 20%，项目报告(Written project report) 50% | | | | | | | | | | |
| \*教材或参考资料 (Textbooks & Other Materials) | 本课程无教材及参考书  （必含信息：教材名称，作者，出版社，出版年份，版次，书号） | | | | | | | | | | |
| 其它（More） |  | | | | | | | | | | |
| 备注（Notes） |  | | | | | | | | | | |
| 备注说明：  1．带\*内容为必填项。  2．课程简介字数为300-500字；课程大纲以表述清楚教学安排为宜，字数不限。 | | | | | | | | | | | |

附表：课程目标达成度评价

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| **Summary of the Attainment of LOs** | | | | |
| Learning Outcomes     Assignments Weight | | LO1 | LO2 | LO3 |
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| Daily activity recording/Supervisor evaluation | 20% | 82.3% | 82.3% |  |
| Brief summary | 20% | 82.3% | 82.3% |  |
| Project report | 50% |  |  | 96.8% |
| Attendence | 10% |  |  |  |
| Total | 100% |  |  |  |
| Weighted averages | | 82.3% | 82.3% | 96.8% |