

课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	课程名称 Course Title	定量生理学（二）Quantitative Physiology II
2.	授课院系 Originating Department	生物医学工程系 Department of Biomedical Engineering
3.	课程编号 Course Code	BMEB312
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	专业核心课 Major Core Courses
6.	授课学期 Semester	春季 Spring
7.	授课语言 Teaching Language	中英双语 English & Chinese
8.	授课教师、所属学系、联系方式 Instructor(s), Affiliation & Contact (For team teaching, please list all instructors)	陈放怡, 副教授, chenfy@sustc.edu.cn Fangyi Chen, Associate Professor, chenfy@sustc.edu.cn
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	待公布 To be announced
10.	选课人数限额(可不填) Maximum Enrolment (Optional)	

11. 授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other (Please specify)	总学时 Total
学时数 Credit Hours	48				48
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	定量生理学 (一)				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	无 None				
14. 其它要求修读本课程的学系 Cross-listing Dept.					

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

Students are introduced to a quantitative, engineering approach to cellular biology and mammalian physiology. QPII progresses to consider the major physiological systems of the human body (nervous, renal, circulatory, and respiratory).

通过该课程, 使学生能够将对于细胞生物学及哺乳动物生理学的基于定量、工程方法的认识, 拓展至人体的主要系统(如: 神经系统、泌尿系统、循环系统及呼吸系统)中。

16. 预达学习成果 Learning Outcomes

To develop an understanding of the physiology of the major systems of the human body from both a biological and a quantitative perspective through an engineering approach based on mathematical models and analysis.

通过基于数学建模分析的工程方法, 从生物学角度对人体主要系统的生理建立定量认识。

17. 课程内容及教学日历 (如授课语言以英文为主, 则课程内容介绍可以用英文; 如团队教学或模块教学, 教学日历须注明主讲人)

Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

Nervous; 神经系统:

1. Neuron / Nerve Anatomy; 神经元/神经的解剖结构 (2 学时)
2. Nernst Potentials; Nernst 电位 (2 学时)
3. Hodgkin Huxley Model; Hodgkin Huxley 模型 (2 学时)
4. Hodgkin Huxley and AP; Hodgkin Huxley 和动作电位 (2 学时)
5. Nerve Conduction HW 1; 神经传导 HW1 (2 学时)
6. Nerve Conduction & Myelin; 神经传导和髓鞘 (2 学时)
7. Transmission; 神经传递 (2 学时)

Renal; 泌尿系统:

8. Kidney Anatomy; 肾脏的解剖结构 (2 学时)
9. Function & Anatomy HW 2; 功能和解剖结构 HW2 (2 学时)
10. Glomerulus; 肾小球 (2 学时)
11. Loop of Henle; Henle 循环 (2 学时)

Cardiovascular; 循环系统:

12. Heart Structure / Function; 心脏的结构和功能 (2 学时)
13. Systemic Circulation; 循环系统 (2 学时)
14. Circulation continued HW 3; 循环系统 (续) HW3 (2 学时)
15. Electrical Activity / ECG; 电生理行为/心电图 (2 学时)
16. ECG, Cardiac Cycle; 心电图, 心电周期 (2 学时)
17. F-L, P-V Relationships (2 学时)
18. Cardiac Model HW 4; 心电模型 HW4 (2 学时)
19. Peripheral Model; 周围模型 (2 学时)
20. Combined Model; 组合模型 (2 学时)
21. Lung Anatomy; 肺的解剖结构 (2 学时)
22. Ventilation, Surfactant HW 5; 肺通气, 肺表面活性物质 HW5 (2 学时)

Respiratory; 呼吸系统

23. Gas Exchange; 气体交换 (2 学时)
24. Perfusion / Ventilation; 灌注/通气 (2 学时)

18. 教材及其它参考资料 Textbook and Supplementary Readings

1. WF Boron and EL Boulpaep, *Medical Physiology*: 2nd ed. Updated Saunders, New York, 2011.
2. K&S = J Keener and J Sneyd, *Mathematical Physiology*: 2nd edition Springer Verlag, New York, 2009. The pages are posted on CourseWorks

19. 评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance				
课堂表现 Class Performance				
小测验 Quiz		10		
课程项目 Projects				
平时作业 Assignments		30		
期中考试 Mid-Term Test		20		
期末考试 Final Exam		40		
期末报告 Final Presentation				
其它（可根据需要 改写以上评估方式） Others (The above may be modified as necessary)				

20. 记分方式 GRADING SYSTEM

- A. 十三级等级制 Letter Grading
 B. 二级记分制（通过/不通过） Pass/Fail Grading

课程审批 REVIEW AND APPROVAL

21. 本课程设置已经过以下责任人/委员会审议通过
 This Course has been approved by the following person or committee of authority