

# 课程大纲

## COURSE SYLLABUS

1.	<b>课程代码/名称</b> <b>Course Code/Title</b>	PHY5057 生物物理学 Biological Physics
2.	<b>课程性质</b> <b>Compulsory/Elective</b>	专业选修课 Major Elective Courses
3.	<b>课程学分/学时</b> <b>Course Credit/Hours</b>	3/48
4.	<b>授课语言</b> <b>Teaching Language</b>	中文 Chinese
5.	<b>授课教师</b> <b>Instructor(s)</b>	刘松 LIU Song
6.	<b>是否面向本科生开放</b> <b>Open to undergraduates or not</b>	是 YES
7.	<b>先修要求</b> <b>Pre-requisites</b>	(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.) PHY204 热力学与统计物理 I Thermodynamics and Statistical Physics I
8.	<b>教学目标</b> <b>Course Objectives</b>	(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)  本课程将讲授生命体系的热力学性质、生物分子和细胞的结构及功能、生物分子和细胞的扩散及运动等内容, 目标是使学生理解和熟悉这些生物体系中的物理模型、分析方法和技术手段。 This course will teach the thermodynamics properties of living systems, the structure and function of biomolecules and cells, and the diffusion and movement of biomolecules and cells, with the aim that students will understand and be familiar with the physical models, analysis methods and techniques in these biological systems.
9.	<b>教学方法</b> <b>Teaching Methods</b>	(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)  本课程为理论课程, 教学以课堂讲授为主。 This course is a theoretical course and will be taught mainly with lectures in the class.
10.	<b>教学内容</b> <b>Course Contents</b>	(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)
	<b>Section 1</b>	细胞结构和成分 Cellular structures and components

<b>Section 2</b>	细胞中的力学和化学平衡 Mechanical and chemical equilibrium in the cell
<b>Section 3</b>	细胞中的统计力学 Statistical mechanics in the cell
<b>Section 4</b>	随机游走和大分子结构 Random walks and the structure of macromolecules
<b>Section 5</b>	盐溶液的静电学 Electrostatics for salty solutions
<b>Section 6</b>	低雷诺数下的运动 Motion in low Reynold numbers
<b>Section 7</b>	生物中的自组织 Self-organization in biology
<b>11. 课程考核</b> <b>Course Assessment</b>	
<p>(①考核形式 Form of examination; ②. 分数构成 grading policy; ③如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)</p> <p>作业 Homework 60 % 项目报告 Project 20% 现场报告 Presentation 20% 在项目报告和现场报告中, 学生需要针对前沿研究和科学问题进行文献调研, 完成书面和口头报告。</p>	
<b>12. 教材及其它参考资料</b> <b>Textbook and Supplementary Readings</b>	
<p>Philip Nelson, Biological Physics: Energy, Information, Life. Philip Nelson, Physical Models of Living Systems. Rob Phillips, Jane Kondev, Julie Theriot, Physical Biology of the Cell. Bialek, W., Biophysics: Searching for Principles.</p>	