

# 课程大纲

## COURSE SYLLABUS

1.	<b>课程代码/名称 Course Code/Title</b>	<b>BIO5020 高级实验训练（生物） Advanced Biological Experiments</b>
2.	<b>课程性质 Compulsory/Elective</b>	专业课/Compulsory
3.	<b>课程学分/学时 Course credits/Hours</b>	3/96
4.	<b>授课语言 Teaching Language</b>	中英文/Chinese and English
5.	<b>授课教师 Instructor(s)</b>	研究生指导教师/Graduate Students' Advisor
6.	<b>先修要求 Pre-requisites</b>	无/None
7.	<b>教学目标 Course Objectives</b>	
	<p>生物是一门实验性学科。训练一个合格的研究生通常需要不止一年的时间。本课程拟在研究生已经接受一定科学实践训练的基础上进一步巩固和拓展其实验技能。因此，本课程将更多的根据具体实验室所必需的高端技术，结合相应的基础知识，来提高学生对生命现象的机理机制的认识。同时，将贯彻用理论指导实践创新的探索精神。</p> <p>Biology is a discipline based on experiments, even more so at the postgraduate level. In fact, it takes longer than a year to train a postgraduate student to get accustomed to biological research. The current course is designed for students who have previously received initial training in biological research and are aiming to consolidate and expand their experimental skills. As such, this course will be more tailored towards advanced experimental need of the specific research group, which, together with relevant background knowledge, will facilitate the students' understanding of the mechanisms underlying life. This will reinforce core education values such as experimental innovation based on theoretical guidance.</p>	
8.	<b>教学方法 Teaching Methods</b>	
	<p>首先，该课程就利用现有的检测中心的生命平台资源，对学生进行一系列的关于核酸定量分析，细胞成像，流式细胞分析，小动物活体成像，和生物电镜测试相关的技能培训与理论知识强化，将邀请检测中心的责任工程师对相关实验操作和结果分析方法、软件进行讲解，研</p>	

究生必需参加。其次，对开始启动的研究生课题的学生，该课程将结合已经锻炼如何根据不同的研究目的进行实验设计和优化。最终，该课程将促进学生建立对实验结构的逻辑推断和批判思维。

First, we will utilize the life science platform of the characterization center and have the students attend theoretical and technical trainings on key techniques/equipments such as nucleic acid quantification, cell imaging, flow cytometry, IVIS Spectrum In Vivo Animal Imaging, and biological electron microscopy. We will also invite the engineer in-charge from the Characterization Center to give lectures on experimental details and data analysis. Second, for students who have already started their thesis project, this course provides training on how to design and optimize experiments tailor to specific questions. Finally, this course demand the students to acquire scientific, logical and critical thinking ability on how to structure experiments.

**9. 教学内容 Course Contents**

教学内容：在每个学生选定该课程之后，研究生指导教师对学生的理论知识基础和研究经历做出初步评估，并结合实验室研究方向与学生的学习兴趣提出一个初步的研究意向，并指导学生就此意向进行有效的文献调研工作，调研后学生与导师讨论协商确定立项，立项后，在研究生指导教师的指导下，每个研究生开展具体的实验工作，完成相关领域的文献追踪阅读和实验技能巩固并定期向导师汇报进展情况，学期末提交一份项目结题报告，报告应同时包括相关领域研究进展及研究生本人的研究结果。

学时分配：春季开设，开设时间为一学期，至少 96 学时，具体由导师和研究生协商决定。

Teaching Content: For every student who has taken this course, the students' scientific advisor will first give an initial evaluation on their background knowledge base and research experience, then provide a preliminary project guideline based on the student's interest as well as the research focus of the group. Accordingly, the students will then perform a literature review within project guideline, after which the project title and research objectives are to be finalized upon consultation with the advisor. Following the assignment of a research topic, the students are to conduct scientific experiments under the guidance of the advisors, and to regularly report experimental as well as scientific progress to the advisors. At the end of the semester, the student will hand in a project report, which should cover both student's as well as others' research progress in the field.

This course is designed on a semester basis in the spring semester. It will take at least 96 school hours but usually more than this, the precise school hours are

	<p>project based and will be determined by the students' advisors.</p>
10	<p><b>课程考核 Course Assessment</b></p>
	<p>根据学生提交的项目结题报告书和平时在实验室接受训练时的动手表现，导师综合评定，给与“通过/不通过”的评价。</p> <p>Based on the final project report and the daily performance in the lab, the students' advisor will give a pass or fail to assess the course grade.</p>
11	<p><b>教材及其它参考资料 Textbook and Supplementary Readings</b></p>
	<p>每个导师根据实验室和学生的具体情况来安排相关的科研文献和实验技能培训。</p> <p>Every students' advisor is to provide relevant scientific literature and experimental technical training based on the specific need of the research laboratory.</p>