

课程大纲 COURSE SYLLABUS

1.	课程代码/名称 Course Code/Title	Introduction to Cryo-EM
2.	课程性质 Compulsory/Elective	Elective
3.	课程学分/学时 Course Credit/Hours	1credits 16 hours
4.	授课语言 Teaching Language	Chinese/English
5.	授课教师 Instructor(s)	Chuang Liu 刘闯
6.	先修要求 Pre-requisites	N/A
7.	教学目标 Course Objectives	
	The students will have a comprehensive understanding of Cryo-EM, understanding the basic principles and procedures. When having a new sample at hand, they will know how and where to get started.	
8.	教学方法 Teaching Methods	
	Teaching in classroom and practicing data processing with students' own laptops	
9.	教学内容 Course Contents	
	Section 1	Principles of electron optics
	Section 2	Structure of Electron microscope
	Section 3	Formation of image
	Section 4	Sample preparation methods
	Section 5	Image processing
	Section 6	3D reconstruction and result interpolation
	Section 7	Data processing practice
	Section 8	Data processing practice
	Section 9	
	Section 10	
	
10.	课程考核 Course Assessment	
	请再此注明：①考查/考试；②分数构成。 Course with the requirement to submit a term paper Scores will be composed by requirement paper, attendance.	
11.	教材及其它参考资料 Textbook and Supplementary Readings	

冷冻电镜相关书籍:

《Three-Dimensional Electron Microscopy of Macromolecular Assemblies》

by Joachim Frank

冷冻电镜基本原理书籍:

《Diffraction Physics》 Third Revised Edition by John M.Cowley

《电子衍射物理教程》 by 王蓉

《电子晶体学与图像处理》 by 李方华

《薄晶体电子显微学》 by P. Hirsch

视频:

冷冻电子显微镜 (Cryo-EM) 入门 by 加州理工学院 Grant J.Jensen

链接: <https://www.coursera.org/learn/cryo-em>

MRC Lectures:

链接: <ftp://ftp.mrc-lmb.cam.ac.uk/pub/scheres/EM-course>

Advances in Cryo-EM related book

Cryo-EM Part A-C & Recent advances in cryo-EM (Methods in Enzymology)

链接: <http://www.sciencedirect.com/science/bookseries/00766879/481>

<http://www.sciencedirect.com/science/bookseries/00766879/482>

<http://www.sciencedirect.com/science/bookseries/00766879/483>

<http://www.sciencedirect.com/science/bookseries/00766879/579>

Reviews of Cryo-EM:

"A primer to single-particle cryo-electron microscopy."

<https://www.ncbi.nlm.nih.gov/pubmed/25910204>

"Structural analysis of macromolecular assemblies by electron microscopy." <https://www.ncbi.nlm.nih.gov/pubmed/21919528>

Structural Analysis of Protein Complexes by Cryo Electron Microscopy

https://link.springer.com/protocol/10.1007%2F978-1-4939-7033-9_28

