

课程大纲

COURSE SYLLABUS

1.	课程代码/名称 Course Code/Title	****/高级显微镜：基础与运用 Advanced Microscope: Foundation and Application
2.	课程性质 Compulsory/Elective	必修 Compulsory
3.	课程学分/学时 Course Credit/Hours	3 学分/48 学时 3 Points/48 Periods
4.	授课语言 Teaching Language	English
5.	授课教师 Instructor(s)	Dayong Jin
6.	是否面向本科生开放 Open to undergraduates or not	Not
7.	先修要求 Pre-requisites	(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.) 光学、细胞生物学、医学影像技术学、光电检测
8.	教学目标 Course Objectives 了解显微成像发展历史与显微镜分类及应用特征, 熟悉当前主流显微成像技术最新发展动态, 掌握各类显微成像技术的物理原理、系统构成及临床和生物医学应用, 具备对各类成像技术后续深入研究的能力。 (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.)	
9.	教学方法 Teaching Methods 课堂讲授+主题报告+辅导答疑 (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.)	
10.	教学内容 Course Contents (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.)	
	Section 1	Overview
	Section 2	Microscopy Basics and History
	Section 3	Basics of Light - Light-matter interactions
	Section 4	Light source and lasers
	Section 5	Pulsed Laser & Femtosecond Lasers
	Section 6	Laser tissue interactions and laser safety
	Section 7	Optical Filters (spectrum)
	Section 8	Detectors
	Section 9	Cameras
	Section 10	Fibers

Section 11	Lens and Objectives
Section 12	Fluorescent Dyes and Stains
Section 13	Fluorescent Proteins
Section 14	Advanced Fluorescent Probes
Section 15	Fluorescence microscopy (Part I)
Section 16	Fluorescence (Stereo) microscopy (Part II)
Section 17	Time-gated luminescence microscopy
Section 18	TIRF microscopy
Section 19	Contrast in Optical Microscopy
Section 20	Scanning Microscopy & Flow Cytometry
Section 21	Confocal Microscopy – PSF engineering
Section 22	Confocal Microscopy – Scanning and Spin Disc
Section 23	Two photon microscopy
Section 24	Super Resolution microscopy
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课程考核 Course Assessment	平时作业 30%+课程报告 30%+结业答辩 40%
11.	<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> <ul style="list-style-type: none"> ■ 48 Lectures over 8 weeks: The class consists primarily of lectures and lecture discussions with mini tutorials and mini guest lectures as necessary. ■ Reading & attendance, and discussion (30%) ■ Seminar (30% + 10%): individual + group performance score ■ There is an end of term quiz (30%) - week 8 (27 Dec) ■ Final Grade: reading & attendance + seminar + end of term quiz ■ Evaluation Instrument <ul style="list-style-type: none"> - questions (prepare you better for the course and your postgraduate research) - the lecture content and the lecturer (help this lecture better)
教材及其它参考资料 Textbook and Supplementary Readings	
12.	《工程光学》、《声学显微镜与超分辨率成像理论及应用》、《活细胞成像》、《细胞生物学荧光技术原理和应用》