

课程大纲 COURSE SYLLABUS

1.	课程代码/名称 Course Code/Title	细胞和组织工程 / Cells and Tissue Engineering
2.	课程性质 Compulsory/Elective	选修 / Elective
3.	课程学分/学时 Course Credit/Hours	3 学分 / 48 学时 3 credits/ 48 hours
4.	授课语言 Teaching Language	中英文 Chinese/English
5.	授课教师 Instructor(s)	郭琼玉 / Qiongyu Guo
6.	先修要求 Pre-requisites	无 / Not applicable
7.	教学目标 Course Objectives	
	<p>This course aims to develop an in-depth understanding of tissue engineering as a treatment concept to replace and recover the anatomic structure and functions of the defected, damaged, injured, or missing tissue and organs.</p> <p>Upon successful completion of this course, students will be able to demonstrate understanding of fundamentals of cells and tissue development, biologic and molecular basis for tissue engineering, biomaterials for regenerative medicine, as well as biotechnologies and therapeutic applications.</p>	
8.	教学方法 Teaching Methods	
	<p>Teaching material will be gathered from textbooks and scientific journal articles.</p> <p>Group discussions will be used to critically analyze scientific results and engineering designs.</p> <p>Each student will write a proposal of a topic related to the course, and give a presentation to the class.</p>	
9.	教学内容 Course Contents	
	Section 1	Introduction: Describe the main objectives of the course
	Section 2	Biology of regeneration: Regeneration at molecular, cell, and tissue levels
	Section 3	Fundamentals of tissue development: epithelium, connective tissue, muscle tissue and nerve tissue
	Section 4	Cell therapy: Cell sources, isolation, preservation, proliferation and migration
	Section 5	Stem cell therapy: Stemness, plasticity, modification and therapeutic potentials
	Section 6	Extracellular matrix: Structural protein, specialized protein and proteoglycan
	Section 7	Biological factors: Growth factors, cytokines, chemokines and hormones
	Section 8	Scaffolding: Structure, guidance cues, surface chemistry and biocompatibility
	Section 9	Transport: Mass transport and vascularization in tissue function

	Section 10	Proposal writing: Specific aims, background, significance, preliminary data and experimental design
	Section 11	Polymeric biomaterials: Polymer composition, chemistry and functionality
	Section 12	Review: Provide case studies and future challenges
10.	课程考核 Course Assessment	
	30% 平时作业 30% 课程报告 40% 期末考试	
11.	教材及其它参考资料 Textbook and Supplementary Readings	
	Anwarul Hasan, “ Tissue Engineering for Artificial Organs: Regenerative Medicine, Smart Diagnostics and Personalized Medicine ”, Wiley-VCH, 2017, Online ISBN:9783527689934. Anthony Atala et al, “ Principles of Regenerative Medicine, 3rd Edition ”, Elsevier, 2018, eBook ISBN: 9780128098936.	