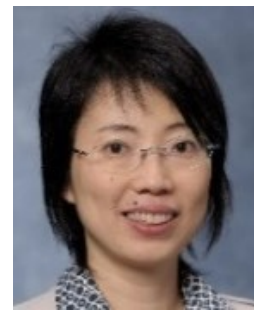


Biomaterials and Biocompatibility (3 Credits)

生物材料和生物相容性



Instructor	Tracy CUI, Department of Bioengineering, University of Pittsburgh (xic11@pitt.edu)
Synopsis	This course is designed to introduce students to a more advanced understanding of biomaterials. Throughout the course ties are made between the topic of study and clinically relevant biomaterial performance. The course will introduce various biomaterials such as polymers, metals, and ceramics with the focus on their synthesis, characterization, structure-property relationship and surface modification. The biocompatibility issues of biomaterials will be discussed from different aspects such as protein adsorption, foreign body reaction, immune and inflammatory response etc. Finally, examples of clinical applications will be given.
Offering	2014 Summer Semester
Audience	Year 3 and 4 Undergraduates and First Year Graduate Students
Classroom	Room XXX, Teaching Bldg. No. XXX, Peking University
Schedule	<u>Class</u> : 8-11 AM, M-F, July 7–25, 2014; <u>Final Exam</u> : 8-11 AM, July 26, 2014

Objectives	To be familiar with the general types of materials used in biomedical applications. To understand the basic principles behind tissue response to artificial device implantation. To understand techniques utilized to control the physiologic response to implants. To be familiar with the design strategies and clinical applications of biomaterials.	
Topics	1. Introduction of different materials (polymers, metals, ceramics, glasses, and nature derived materials) 2. Surface analysis and surface modification 3. Protein adsorption and cell adhesion 4. Inflammatory host tissue response, foreign body reaction and wound healing 5. Immune response 6. Blood-biomaterial interaction 7. Calcification, tumorigenesis and Infection 8. In vitro and in vivo biocompatibility evaluation 9. Biomaterial design strategies in clinical applications (cardiovascular, neurological, drug delivery, etc.)	
Text/Reference	Temenoff and Mikos, <i>Biomaterials: The intersection of Biology and Materials Science</i> (2008). Buddy Ratner, <i>Biomaterials Science: An Introduction to Materials in Medicine</i> (2004).	
Grading	Homework	30%
	Quizzes	20%
	Final Exam	40%
	Participation	10%
	Total	100%