Course title: Polymers in Biomedical Engineering
Instructor: Dr. Jian Yang, Email: jianyang@uta.edu
Fall 2011; Time: Monday and Wednesday 4 PM – 5:20PM
Room: ERB 130

Course description: Interests in polymeric biomaterials for biomedical use, especially in regenerative medicine, have increased dramatically during the past decade. Polymeric materials include synthetic polymers, natural polymers (polysaccharide, protein, lipid, DNA, acellular tissues), micro-/nano-composite polymers, and biologically oriented synthetic polymers. The course will provide students with a solid foundation in polymeric biomaterial design, synthesis, characterization, process, and applications. The topics include polymeric biomaterials design, surface-engineering of polymeric biomaterials, functionalization of polymeric biomaterials, characterization of polymeric biomaterials, micro- and nano-fabrication of polymeric biomaterials, cell/tissue-polymeric biomaterial interactions, and the biomedical applications of polymeric biomaterials in cardiovascular, neural, musculoskeletal engineering, orthopaedic device, drug delivery, and gene therapy. This course is open to students from all departments in college of engineering and college of science.

- Theory of polymer chemistry and physics
- Synthetic polymers;
- Natural polymers
- Biologically oriented synthetic polymers
- Advanced biomaterials design
- Surface engineering of polymeric biomaterials
- Functionalization of polymeric biomaterials
- Miro/nano fabrication of polymeric biomaterials
- Cell/tissue-Biomaterials interaction
- Biomedical applications of polymeric biomaterials

Course Outcomes:

1) Students should be able to understand the basic principles and features of polymeric materials, identify and understand key structure-property-processing relationship of polymers;
2) Students should understand the roles of the polymer design play in the biomedical applications;
3) Students should be able to master the trend of polymeric biomaterials and communicate with the people in the field;
4) This course should help students to build up a good connection between their previous background and the use and design of the contemporary polymeric biomaterial.
5) Students will gain proficiency in scientific presentation.
Reference Books:

- Biomaterials. The Intersection of Biology and Materials Science. JS Temenoff, AG Mikos. 2008 Pearson Prentice Hall (UTA Bookstore)
- Biomaterials science: an introduction to materials in medicine / edited by Buddy D. Ratner ... [et al.], Call Number: R857.M3 B5735

Teaching Assistant

Michael Palmer (michael.palmer@mavs.uta.edu), ERB 277

Lecture notes

Notes will be uploaded to the class folder (ftp://students.uta.edu/, class folder BE5300-010). Students are expected to make additional class notes by themselves.

Attendance Policy:

Student should attend the class as much as he/she can as the attendance will be given at 10% of students’ grading.

Homework, Exams and Grading

- Homework
- Final exam (Dec.12nd, 4-5:20 pm, in class exam) 40%
- Presentation (date TBD, 3 min or 15 min presentation) 20%
- Lab report 10%

Homework, Exams and Grading: 100%

30% + 40% + 20% + 10% = 100%
**Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. Contact the Financial Aid Office for more information.

**Academic Integrity:** It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University. According to the UT System Regents’ Rule 50101, §2.2, "Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts."

**Student Support Services Available:** The University of Texas at Arlington has established a variety of programs to help students meet the challenges of college life. Support to students includes advising, counseling, mentoring, tutoring, supplemental instruction, and writing assistance. For a complete list of academic support services, visit the Academic Assistance resource page of the Office of Student Success Programs, "http://www.uta.edu/uac/studentsuccess/academic-assistance". To help students address personal, academic and career concerns, individual counseling is also available. For more information, students are encouraged to contact Counseling Services "http://www.counseling.uta.edu/" at (817) 272-3671 or visit a counselor in 216 Davis Hall.

**Electronic Communication Policy:** The University of Texas at Arlington has adopted the University “MavMail” address as the sole official means of communication with students. MavMail is used to remind students of important deadlines, advertise events and activities, and permit the University to conduct official transactions exclusively by electronic means. For example, important information concerning registration, financial aid, payment of bills, and graduation are now sent to students through the MavMail system. All students are assigned a MavMail account. **Students are responsible for checking their MavMail regularly.** Information about activating and using MavMail is available at "http://www.uta.edu/oit/email/". There is no additional charge to students for using this account, and it remains active even after they graduate from UT Arlington. Students can access class information on website: "ftp://students.uta.edu".

**Americans with Disabilities Act:**
The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112 - The
Rehabilitation Act of 1973 as amended. With the passage of federal legislation entitled *Americans with Disabilities Act (ADA)*, pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens. As a faculty member, I am required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty of their need for accommodation and in providing authorized documentation through designated administrative channels. Information regarding specific diagnostic criteria and policies for obtaining academic accommodations can be found at www.uta.edu/disability. Also, you may visit the Office for Students with Disabilities in room 102 of University Hall or call them at (817) 272-3364.

**STATEMENT ON ETHICS, PROFESSIONALISM, AND CONDUCT FOR ENGINEERING STUDENTS**

Students need to sign