BMES 5372-004 (85234): DRUG DELIVERY

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TAs: Nathan Priegnitz: npriegnitz@gmail.com (grading homework only); Aniket Wadajkar : aniketwadajkar@yahoo.com (questions related to lectures)

Office Hours: 2:20-3:20 pm, Tuesday and Thursday

Course Number, Section Number, and Course Title: BE 5372-004 (85234), Drug Delivery

Time and Place of Class Meetings: Tuesday and Thursday 3:30 – 4:50pm @ WH308

Description of Course Content: This class will introduce students the concept of drug delivery systems that provide pharmaceutical agents at target tissues, the mechanism of pharmacokinetic regulation, the basics, technology, and applications of drug delivery systems. The emphasis is on understanding the principles of pharmacokinetics and drug delivery systems to improve clinical efficacy as well as to reduce side effects and on realizing the importance of the field, drug delivery.

Student Learning Outcomes: Midterm exam, homework, project, and final exam are applied for measuring the student learning outcomes in the long-term. In addition, questions will be given in each lecture, and student participation will be used to measure student learning outcomes. Lectures will then be adjusted accordingly to facilitate student learning.

Requirements: Students should have some biomaterials background.

Required Textbooks and Other Course Materials: recommended not required, and these books are placed in Science and Engineering Library Reserve

1. *Drug delivery systems.* Editors: Ranade VV, Hollinger MA. CRC Press.
2. *Drug delivery and targeting for pharmacists and pharmaceutical scientists*
   Editors: Hillery AM, Lloyd AW, and Swarbrick J. Taylor & Francis Inc.
3. *Drug delivery – Engineering principles for drug therapy*
   Editor: Saltzman WM. Oxford University Press.

Access to the class information: Students can access class information including class syllabus and project samples on website: ftp://students.uta.edu, username: uta/netid, and password: netid password. Students need to sign in, and then click on the class folder to find be5372 folder for this class's documents.

Description of major assignments and examinations with due dates:
Students are expected to attend lectures, read and understand all handouts. Students are also expected to participate in discussions of problems presented during lecture periods. Verbal and written reports are required to develop communication skills for graduate students. ***Students are expected to work independently on exams and projects.***

For the project, students will choose a topic related to drug delivery systems, which must be approved by the instructor, and be required to present their projects in class in addition to the written report (10-15 pages). Format of oral presentation and written report is similar to the proposal type. These reports should include background introduction, your research topic, a problem that you work on, your strategy to solve this problem, how you assess your strategy to determine whether it will work, limitations of your strategy and alternatives if possible. Each presentation will be of 12 minutes in addition to 3 minutes for questions and discussion (see sample grading sheet). Grading of presentation will be based on class-mates (25%), the TA (25%), and instructor (50%).
Late turn-in homework and project reports will be returned without a score (i.e. it will have a score of 0%). Students should refer to the class schedule at the end of this handout for all due dates. **There will be no make-up given for missed exams, unless the reason is explained with an accompanying document.**

Homework will be given to the students whenever necessary to help students understand the subjects. For the ethical homework, students need to find an ethical case related to drug delivery using web search and/or journal search and then discuss/debate about their cases with their classmates in the assigned lecture. The TA will monitor the discussion for this ethical class. Other homework assignments involve with articles related to the class topics. Students need to select an article related to one of class topics as specified later and write a report based on this article; for example, students should write about how the authors formed nanoparticles, how they tested their nanoparticles, major results from their tests, and limitations/problems if any in the article.

Grading Policy:
COURSE ASSESSMENT

Midterm exam	30%
Project Presentation	20%
Final exam	30%
Home work	20%

EVALUATION OF STUDENTS

A	85-100%
B	75-85%
C	65-75%
D	50-65%
F	Below 50%

Attendance Policy: Student should attend the class as much as he/she can.

Drop Policy: Refer to the university drop policy.

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.

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.

"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." (Regents' Rules and Regulations, Series 50101, Section 2.2).

Plagiarism (from Latin *plagiare* "to kidnap") is the practice of claiming, or implying, original authorship or incorporating material from someone else's written or creative work, in whole or in part, into one's own without adequate acknowledgement. Do not copy words by words or major parts from articles (even though you give these articles as references), this act is considered as ***cheating*** in the U.S.

Student Support Services Available:
The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. These programs include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.

OUTLINE OF TOPICS COVERED (date may change due to discussion in class)

Date	Topics	Notes
08/26/2010	Introduction to drug delivery	
08/31/2010	Drug delivery: the basic concepts/principles	
09/02/2010	Polymers in controlled drug delivery	Mandy Su HW1: Write a report for an article related to biodegradable polymers for drug delivery
09/07/2010	Library search for papers and patents	Antoinette Nelson, Central Library B20
09/09/2010	Controlled drug delivery systems	
09/14/2010	Traditional oral drug delivery	**Turn in HW1**
09/16/2010	Nanotechnology in drug delivery (part 1)	Dr. Soujanya Kona HW2: Write a report for an article related to nanoparticles for targeted and controlled drug delivery
09/21/2010	Nanotechnology in drug delivery (part 2)	Dr. Soujanya Kona
09/23/2010	Nanotechnology in drug delivery (part 3)	Dr. Soujanya Kona. **Turn in HW2**
09/28/2010	Implant drug delivery	Aniket Wadajkar
09/30/2010	Drug modification	Mandy Su HW3: Write a report for an article related to transdermal drug delivery systems
10/05/2010	Transdermal drug delivery	Aniket Wadajkar
10/07/2010	Discussion of Ethical Cases (BMES)	**Turn in HW3** HW4: Write a report about an ethical case in drug delivery. **Turn in and discuss HW4 in class**
10/12/2010	Achieving excellence in presentation	Aniket Wadajkar
10/14/2010	Midterm exam	
10/19/2010	Oral presentation	
10/21/2010	Nasal and pulmonary drug delivery	HW5: Write a report for an article related to pulmonary drug delivery
10/26/2010	Oral presentation	
10/28/2010	Stimulated drug delivery (part 1)	Aniket Wadajkar. **Turn in HW5** HW6: Write a report for an article related to temperature-sensitive nanoparticles
11/02/2010	Oral presentation	
11/04/2010	Stimulated drug delivery (part 2)	Aniket Wadajkar. **Turn in HW6** HW7: Write a report for an article related to pH-sensitive nanoparticles
11/09/2010	Oral presentation	
11/11/2010	Protein delivery	Mandy Su. **Turn in HW7** HW8: Write a report for an article related to protein or gene delivery
11/16/2010	Oral presentation	
11/18/2010	Gene delivery/therapy	**Turn in HW8**
11/23/2010	Review math including differential equations	
11/30/2010	Design of drug delivery systems - simulation	
12/02/2010	Future of drug delivery, MEMS for drug delivery	Aniket Wadajkar
12/07/2010	FDA, Regulation issues involved with drug delivery	**Turn in final projects (no late turn-in)**
Dec 11-17	Final exam	