

BME 695L Engineering Nanomedical Systems

Revised 10-23-2007

Supporting Documentation:

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Course Details: meets Tuesdays and Thursdays at 4:30 – 5:45 PM in BME 1083

Lecture Topics and Schedule:

Week 1 (August 21 & 23)

Need for new perspectives on medicine

Basic concepts of nanomedicine + **Paper #1 - distributed**

Week 2 (August 28 & 30)

Overview of basic nanomedical systems design + **Original Research Project paper info**

Designing “theragnostics” systems

Week 3 (September 4 & 6)

Targeting nanomedical systems to cells & assessing specificity

+ Tour of Molecular Cytometry facility

Rare-event targeting of cells in-vitro and in-vivo

Week 4 (September 11 & 13)

Normal & facilitated cell entry mechanisms

No class on 9/13

Attend KIST-Purdue Symposium on 9/14

Week 5 (September 18 & 20) + Paper review #1 due

Technologies for measuring nanomedical systems on/within cells

Atomic Force Microscopy for measuring nanoparticles and cells (Helen McNally)

+ Tour of BioScope AFM Facility

Week 6 (September 25 & 27 Paper review 2 distributed on 9-27-2007 DUE: 10-18-2007

Nanomaterials for core design

Surface chemistry: attaching nanomedical structures to the core (Don Bergstrom)

Week 7 (October 2 & 4)

Assessing nanomaterial composition by XPS + Tour of XPS facility (Dmitry Zemlyanov)

Exam I on 10-4-2007

Week 8 (October 11)

October break Oct. 9 (no class)

Assessing zeta potentials

Week 9 (October 16 & 18) Paper review 2 due + Paper review 3 distributed on 10-18-2007

Challenges of proper drug dosing with nanodelivery systems

Nanodelivery of therapeutic genes & molecular biosensor feedback control systems

Week 10 (October 23 & 25)

Assessing drug efficacy at the single cell level

Week 11 (October 30 & November 1)

Assessing nanotoxicity at the single cell level

No Class on November 1 (***work on your project proposal!***)

Week 12 (November 6 & 8) Paper Review 3 due on 11-8-2007

Designing nanodelivery systems for in-vivo use

Animal testing of nanodelivery systems (Debbie Knapp)

Week 13 (November 13 & 15)

GMP and issues of quality control manufacture of nanodelivery systems

FDA and EPA regulatory issues

Week 14 (November 20) (no class on 11/22)

In class Original Research Proposal Presentations

Week 15 (November 27 & 29)

In class Original Research Proposal Presentations

In class Original Research Proposal Presentations

Week 16:

Finals Week: **Exam2 (Final Exam)**

Grade Assessment:

Literature Reviews (3)	30 %
Project – Original Individual Research Proposal	30 %
Exam 1	15 %
Final/Exam 2	15 %
Class attendance and class participation	10 %

Required Text:

None – discussions and assignments based on primary literature