

BME 695 Engineering Nanomedical Systems 2011

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Supporting Documentation:

Person-In-Charge: James F. Leary, email: jfleary@purdue.edu, Office: BRK 2021

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

Office hours: By appointment

Lecture Topics and Schedule:

Week 1 (August 23 & 25)

Need for new perspectives on medicine

Basic concepts of nanomedicine + **Paper #1 - distributed** on August 25 due Sept. 22

Week 2 (August 30 and September 1)

Overview of basic nanomedical systems design

Original Research Project paper info + Tour of cytometry and bio-nano facilities

Week 3 (September 6 & 8)

Targeting nanomedical systems to cells & assessing specificity

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

Week 4 (September 13 & 15)

Normal & facilitated cell entry mechanisms

Nanomaterials for core design

Week 5 (September 20 & 22) + Paper review #1 due September 22

Importance of zeta potential for targeted nanomedicine

Surface chemistry: attaching targeting and therapeutic molecules to the core

Week 6 (September 27 & 29) + Paper # 2 – distributed on September 29 due October 20

Challenges of proper drug dosing with nanodelivery systems

Nanodelivery of therapeutic drugs/genes & molecular biosensor feedback control systems

Week 7 (October 4 & 6)

Assessing nanotoxicity at the single cell level

Encoding information into nanomedical systems (Trisha Eustaquio)

Week 8 (October 11 & 13)

October 11 (October break - no class)

October 13 – Assessing nanomaterial composition by XPS (Dr. Dmitry Zemlyanov)

Week 9 (October 18 & 20) Paper review 2 due on 10-20-2011

Exam 1 (In-class exam on October 18)

Animal testing of nanodelivery systems (Prof. Debbie Knapp)

Week 10 (October 25 & 27) Paper review 3 distributed on 10-25-2011 DUE: 11-15-2011

Assessing drug efficacy at the single cell level

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

Week 11 (November 1 & 3) Title & Abstract for Class Project Due: November 3

Designing nanodelivery systems for in-vivo use, issues of biodistribution

Designing/evaluating integrated nanomedical systems

Week 12 (November 8 & November 10)

Quality control manufacturing, life cycle assessment, work-place/environmental regulations

Human clinical trials, FDA approval process

Week 13 (November 15 & 17)

Review session for final exam

Exam 2 (In-class Final Exam on November 17)

Week 14 (November 22 & 24) Paper Review 3 due on 11-22-2011

No class – work on your class projects!

November 24 (NO CLASS- Thanksgiving Break)

Week 15 (November 29 & December 1) Written Class Project due for ALL students on or before midnight (23:59:59 for those last minute folks!) on 11/28/2011

In class Original Research Proposal Presentations – 3 students

In class Original Research Proposal Presentations – 4 students

Week 16 (December 6 & 8)

In class Original Research Proposal Presentations – 4 students

In class Original Research Proposal Presentations – 4 students

Grade Assessment:

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

Required Text:

None – discussions and assignments based on primary literature