CBE/BE 554  Engineering Biotechnology  Spring 2007

Instructor: Scott L. Diamond, 1024 Vagelos/IME (dial 3-5702 at door)
           sld@seas.upenn.edu  (please email Brian Siano: siano@seas.upenn.edu, to set up appointments)

Class Hours:  MEYH B3, Tues  4:30 – 7:00 pm

TA:  Sean Maloney (seanfm@seas.upenn.edu)  215-573-5704 (IME Lab)
     Thursday 3:30 – 4:30 pm, Humphrey Lounge (3rd Floor Towne Building)

Textbook:  Applied Molecular Biology (Miesfeld)
           Molecular Biotechnology (Glick)

ReDNA Biotechnology
   Introduction:  Case Study with Tissue Plasminogen Activator
   ReDNA:  Expression vectors: plasmids, subcloning, selection
   PCR, PCR primer design
   RT-PCR, cDNA, energy transfer, Taqman, expression profiling, LCR
   phages, λ phage, selection methods, cosmids
   ssDNA phages, phagemids
   phage display applications
   siRNA, shRNA, miRNA

Reactor design
   Bioreactors and Fermentors
   Chemostat Operation
   Introduction to Reactor Design
   Staged CSTRs

Bioproduction
   Bacterial Fermentor Operation
   Mammalian Cell Systems
   Hybridomas and Antibodies
   Baculovirus Expression
   Virus production (gene therapy, vaccine)

Analytical Biotechnology
   Separation Techniques (Extraction, chromatography)
   Protein Analysis & Immunoassays (ELISA, RIA)
   DNA chips & Medical Diagnostics

Other Topics if Time Permits
   Lab on a Chip (SP 2007)
   Biomedical Device Approval (SP 2007)
   Biotech Startups (SP 2007)

GRADING:  Midterm Exam  35 %
           Homework  10 %
           Final Project  15 %
           Final  40 %