

**BioScience 231: Advanced Topics in Biotechnology: Course Syllabus**

Sect # 23970

Rm # L-201

Prof. Jim Wolf

Office hrs: MW 5:00-6:00 or by appt.

Lect: MW 6:00-7:15 PM

Lab: MW: 7:30-10:00

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Tentative course schedule. May be changed according to progress of class. Lecture may also occur during lab time in order to permit optimize use of time allotted (in light of incubations, gel running and other time consuming events, etc.

MONDAY Note: Double check: Dates Siedman Chapters Amgen Lab # (is break good) CSHL chapters. Scenarios/Videos	WEDNESDAY
1/21 HOLIDAY Martin Luther King	1/23 Course Objectives/Lab Review <b>Module 1: Planning/Execution</b> Amgen 1-7 equipment review and supply requests (Amgen supply req. sheets) Have reagents for 1-7 in container/ fridge Run Lab Amgen Lab # 1. <b>TEXT:</b> Amgen 1-7 Seidman: 28-30 <b>Video:</b> Restriction Endonuclease

<p><b>1/28 Module 1: Execution</b>  Run Amgen 2-5  Need competent cells  <b>TEXT:</b> Amgen 1-7  Quiz on Seidman: 28-30  <b>Video:</b> DNA Ligation  <b>Tuesday:</b> Check for transformants and grow out for Wed. miniprep</p>	<p><b>1/30 Module 1: Execution</b>  Run Amgen 6 (grow out)/7 and Mini prep ID transformants and make enough cultures for mini preps  Save rpGLO plate for use in 230...  <b>TEXT:</b> Amgen 1-7  <b>Quiz on Seidman: 28-30 Due</b>  <b>Polymorphism Quiz Handed Out</b>  Notebook is integration of 2-7 (not individual labs, so 5 pages should be adequate notebook length. )</p>
<p><b>2/4: Module 1: Execution</b>  DNA polymorphisms:  D-1S80 and ALU/PCR reaction  Mitochondrial prep and seq. reaction (Get to CLU)  Ladder Gels: Need 3-4 standards with accompanying mol. Weight legend  Have PCR cocktail and primers pre-aliquoted  <b>TEXT:</b> DNA Polymorphism papers  CSHL Chap # 22,23  <b>Video:</b> PCR and Detection  Sample prep in PCR  Quiz Due: Allele/DNA polymorphisms</p>	<p><b>2/6 Module 1: Execution</b>  D-1S80/ALU gel run/result interp.  Gel Imaging System...(SOP) Pool data  Gel Ladders (we enter data..)  Have DNA Seq. data/gels images available  <b>TEXT:</b> CHSL 22,23  DNA Polymorphism papers and  Phylogenetic Trees: BLAST SOP/Tutorial URL  DNA Phylogeny (Panda.)  Edvotek: Mito DNA seq.  <b>Video:</b> DiDeoxy DNA Seq Rxn.</p>

<p>2/11 <b>Module 1: Execution/Summation</b> Lab Review/Catch Up/ <b>Module 2 Planning</b> TECH Prep note: Transformation, plasmid selection media prep? For DNA library. Start peas TEXT: Seidman 25-27/ DNA Cladistics study Get CLU Get data for sequencing (and or DNA autoradiogram.)</p>	<p>2/13 <b>5 page paper (see paper outline for ideas discussed)</b> <b>Module 2: Planning</b> Organelle isolation: Peas/ activity assay Mitochondrial enzyme reagent Spectrophotometer with mito assay... <b>TEXT:</b> Seidman 25-27 Misc: papers ... Edvotek</p>
<p>2/18 <b>Presidents Day (Holiday)</b> FINISH off MOD 1 Ensure that all resources for putting finishing touches on paper are in place.</p>	<p>2/20 <b>MODULE ONE PROJECT DUE</b> <b>Module 2: Execution</b> Organelle isolation: sponge: CsCl centrifugation/TLC plate/Spectrophotometer Impregnate plugs <b>TEXT:</b> Professor Nishiyama/SOP TECH: need plates for bacteria assay, liquid media for lawn creation (2 strains) and control Control plugs (amp, tetra, etc..)</p>
<p>2/25 <b>Module 2: Execution</b> Prep plates and tubes for propagation. Media prep, and dry run for explant Plate media and broth of two strains of bacteria for plug assay <b>TEXT:</b> Misc papers and SOPs <b>QUIZ:</b> Seidman CH # 25-27 Quiz</p>	<p>2/27 <b>Module 2: Execution</b> Explant and embryo transfers. Next set of Media preparations. Competent cell propagation and freeze down Assess bacterial lawns with plugs <b>TEXT:</b> Misc papers and SOPs <b>Video:</b> Cryopreservng cells. <b>TECH:</b> need bacterial freezing media, and pla for next lab QA/QC check..</p>
<p>3/4 <b>Module 2: Execution</b> Explant and embryo transfers (repeat) Subsample frozen competent cells and streak plates. <b>TEXT:</b> Misc papers and SOPs Start work on literature search and paper identification/summary.</p>	<p>3/6 <b>Module 2: Execution/Summation</b> Assess explants and embryos Assess competent cells <b>TEXT:</b> Start Mod 3 readings (see below) Notebook catch up, go to library to get final module 2 papers. <b>QUIZ: Technique self eval, Seidman 25-27 due</b></p>

<p>3/11 <b>Project 2 Summation Due (Literature Search and Summary Sheets)</b>  Assess explants and embryos  <b>Module 3: Library Construct planning lab.</b>  <b>TEXT:</b> Misc papers and SOP CSHL13-17</p>	<p>3/13 <b>Module 3: Planning: continued</b>  library construct: digestion and gel prep. (comp cell prep.) Ligation  <b>TEXT:</b> CSHL/CH:13-17 and Seidman 21-24  NOTE: A relaxed set of labs...so read ahead and quizzes?  Assess explants and embryos</p>
<p>3/18 <b>Module 3 Execution (make comp cell starting Monday AM..)</b>  Transformation/Plating/ Southern Blot Gel Solution Prep  Note each person does two transformations, one with frozen and other with fresh competent cells.  Assess explants and embryos <b>TEXT:</b> CSHL 14-15..</p>	<p>3/20 <b>Module 3 Execution</b>  Replicate plating, Southern Blot Transfer  <b>TEXT: CSHL:13</b>  Video: Probes and S. Blot Hybridization  Assess explants and embryos  <b>QUIZ Seidman CH # 21-24 Quiz Due</b></p>
<p>3/25 <b>Module 3:Execution</b>  Color Development/Probe / Grow Out Plant tissue culture (last check)  <b>TEXT:</b>CSHL Ch# 16  Assess explants and embryos</p>	<p>3/27 <b>Module 3:Execution</b>  Isolation of plasmid and conformation gels.  <b>TEXT:</b> CSHL CH # 17  Video: Plasmid Mini-prep  Recovery of DNA from Agarose gel..  CSHL Ch # PCR purification FYI</p>
<p>4/1 Spring Break  POSTER BOARD DRAFTS? ....  Prior to break, flesh out a draft and start identifying resources and start work on body text.</p>	<p>4/3 Spring Break</p>
<p>4/8  <b>Module 3: Summary</b>  Poster Board Work</p>	<p>4/10  <b>Module 3: Summary</b>  Poster Board Work</p>
<p>4/15  <b>Project 3 Due: Poster Board Session: Monday 6:30-8:00</b>   Need snacks, refreshments, advertisement (to faculty and 107 /230 students..)  <b>Mod 4: TEXT:</b> Literature specific to project (see separate sheet.)</p>	<p>4/17  <b>Module 4: Outline</b>  Independent Project:  1. ELISA/Plate well reader  2. Spectrophotometer/Lysozyme  3. Transformation/Plasmid Mini prep, gel analysis  Time Lines and Equipment/Supplies Req.</p>

<p>4/22</p> <p><b>Module 4: Execution</b></p> <p>Independent Project:</p> <ol style="list-style-type: none"> <li>1. ELISA/Plate well reader</li> <li>2. Spectrophotometer/Lysozyme</li> <li>3. Transformation/Plasmid Mini prep, gel analysis</li> </ol> <p><b>TEXT:</b> Siedman: 19-20</p>	<p>4/24</p> <p><b>Module 4: Execution</b></p> <p>Independent Project:</p> <ol style="list-style-type: none"> <li>1. ELISA/Plate well reader</li> <li>2. Spectrophotometer/Lysozyme</li> <li>3. Transformation/Plasmid Mini prep, gel analysis</li> </ol> <p><b>TEXT:</b> Siedman CH # 4-7: SOP, GLP and GMP and development.....</p>
<p>4/29</p> <p><b>Module 4: Execution</b></p> <p>Independent Project:</p> <ol style="list-style-type: none"> <li>1. ELISA/Plate well reader</li> <li>2. Spectrophotometer/Lysozyme</li> <li>3. Transformation/Plasmid Mini prep, gel analysis</li> </ol> <p><b>Refine, Trouble shoot, set up demos for time sensitive portions</b></p>	<p>5/1</p> <p><b>Module 4: Execution</b></p> <p>Independent Project:</p> <ol style="list-style-type: none"> <li>1. ELISA/Plate well reader</li> <li>2. Spectrophotometer/Lysozyme</li> <li>3. Transformation/Plasmid Mini prep, gel analysis</li> </ol> <p><b>Refine, Trouble shoot, set up demos for time sensitive portions</b></p>
<p>5/6</p> <p><b>Module 4: Presentation</b></p> <p><b>Independent Project: Pilot Lab</b></p> <p><b>Teams conduct or evaluate....</b></p> <p><b>Post lab review of technique and theory</b></p>	<p>5/8</p> <p><b>Module 4: Presentation</b></p> <p><b>Independent Project: Pilot Lab</b></p> <p><b>Teams conduct or evaluate....</b></p> <p><b>Post lab review of technique and theory</b></p>
<p>5/13</p> <p><b>Module 4: Presentation</b></p> <p><b>Independent Project: Pilot Lab</b></p> <p><b>Teams conduct or evaluate....</b></p> <p><b>Post lab review of technique and Theory</b></p>	<p>5/15</p> <p>FLEX Lab/Exit Interviews/Resumes</p>
<p>FINALS WEEK/ Final Exam....</p>	

**HITE Projects:** Many of your projects are very sophisticated. You should consider an extension of any of these labs an excellent platform to explore a HITE project. Consider the following ideas:

- CD rom showing a tutorial or explanation of a hard to visualize process (i.e. effect of Ca Cl<sub>2</sub> effects on transformation.)
- Make some models showing a dynamic process (i.e. proton pumping and ATP generation in mitochondria.)
- Participate in a biotechnology outreach training workshop and help local faculty implement these resources at their local high school or junior high.
- Create a tutorial showing the use of genetic information to answer evolutionary questions (i.e. BLAST search for phylogenetic trees.)
- Using DNA and EN, create a series of reference ladders (with MW information) to act as reference ladder for the Kodak gel imaging system.
- Develop and refine you independent project in a manner that will make the technology accessible to students in 230 and other less sophisticated courses.
- And many others... so lets talk.

**Please note:** The are very involved HITE projects, and in addition to getting you priority registration, you can add these to your resume or even perhaps use them in interview as demonstration of your ability to create/investigate very sophisticated biological phenomena.