MICROBIOLOGY LABORATORY (BIOL 310L) SCHEDULE

Spring 2016

Lecture Professor: Dr. Susan Morrison
Lab Instructors: Ms. Tracy Hirsch (Sec. 1-3, 5-6)
Dr. Susan Morrison (Sec. 4)

Required:
(1) Pearson Custom Laboratory Manual for BIOL 310L Microbiology, College of Charleston
(2) Coursepack for BIOL310
(3) Sharpie marker, Safety Glasses, Lab Coat; Ms. Hirsch also requires a bound composition notebook.

Experiment numbers are given on pages I—IV. For convenience, transfer those numbers to the orange blocks on the first page and results page of your Pearson Manual.

All students are expected to attend lab at their assigned lab time. There is limited space for additional students in most lab sections. If you cannot attend at your scheduled time, you must get permission in advance for each time you need to come to a different lab and you must have a reason the instructor deems valid.

<table>
<thead>
<tr>
<th>LAB Ex. # &amp; DATE</th>
<th>SUMMARY OF LAB ACTIVITIES</th>
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<tbody>
<tr>
<td><strong>SOURCE</strong></td>
<td><strong>EXERCISES &amp; READINGS</strong></td>
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<tr>
<td>“Pack” pages refer to the BIOL 310 coursepack from SAS-E-Ink. The Manual pages refer to the Pearson custom manual. Everything that is listed must be read before coming to class. Unless otherwise indicated, you should answer ALL questions in exercises that we do or read or discuss or see demonstrated. That includes questions with a light bulb, and questions in both the lab manual and the coursepack.</td>
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I January 12-14 INTRODUCTION; SAFETY; ASEPTIC TECHNIQUE; USE OF MICROSCOPES; EPIDEMICS; OBSERVATION OF PREPARED SLIDES; ENVIRONMENTAL SAMPLE

- pp. 1-4; **Pack 206-227** Laboratory Safety & Protocol
- pp. 5-10 Microbiological Equipment & Basic Laboratory Techniques
- Ex. 1 Culture Transfer Techniques (Q1-3)
- Ex. 2 Techniques for Isolation of Pure Cultures:
  - & Pack 260-261 Part A. Isolation of discrete colonies from a mixed culture
  - Part B. Isolation of pure cultures from a streak plate preparation
- pp. 33-34 Microscopy
- Ex. 4 Microscopic Examination of Stained Cell Preparations (Q 1-3)
- Appendix p 327 Scientific notation (be able to use)
- **Pack 240-241** An Artificial Epidemic
- **Pack 243-246** Distribution of Microorganisms in the Environment (Q 1-6)

Notes:
+ indicates exercise for which follow-up will be necessary. The time in brackets [ ] indicates the approximate time span at which follow-up should be done.

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**NOTE:** In addition to the questions for exercises which you do, you are also responsible (on tests and in your notebooks) for questions in exercises requiring only reading and for results and questions for exercises done as demonstration. You are also responsible for all parts of the exercises done from the coursepack or handouts, as well as from the lab book.
II January 19-21  ASEPTIC TECHNIQUE (continued); PREPARATION OF SLIDES & OBSERVATION OF SIMPLE STAINS & NEGATIVE STAINS
Ex. 1 Review Culture Transfer Techniques (pp. 11-16) (Q 1-3)
Ex. 2 + Techniques for Isolation of Pure Cultures:
  & Pack 260-261 Part A. Isolation of discrete colonies from a mixed culture
  Part B. Isolation of pure culture from a streak plate preparation (Q 1-4)
pp. 53-55 Bacterial Staining
Appendix p 341 Staining Reagents (for reference only)
Ex. 7 Negative Staining (Q 1-3)
Ex. 8 Preparation of Bacterial Smears (Q 1-4)
Ex. 9 Simple Staining (Q 1-3)
Pack 247-253 + Distribution of Microorganisms in the Environment ---complete using “Cultural Characteristics of Microorganisms

III January 26-28  PREPARATION OF CULTURE MEDIA; THE AUTOCLAVE; PATHOGEN POSTER PROJECT INTRODUCTION GRAM STAIN; USE OF SPECIAL PURPOSE MEDIA (SELECTIVE & DIFFERENTIAL); ISOLATION OF PURE CULTURES; BEGIN IDENTIFICATION OF “UNKNOWN” BACTERIAL CULTURE;

Pack 280-285 Begin pathogen poster project ---Organize teams of 4 students, select pathogen & normal microbiota
Pack 253-254 Preparation of Culture Media [read and understand; we will not be able to carry this out because our temporary lab is not adequately equipped.]
Appendix p 331 Culture Media (for reference only)
pp. 95-96 Cultivation of Microorganisms: Nutritional & Physical Requirements, and Enumeration of Microbial Populations
Ex. 13 Nutritional requirements: Media for the routine cultivation of bacteria
Ex. 33 Discussion of Enrichment Cultures Physical agents of control: Moist Heat (Read pp. 221-222) (Answer Q 1-6 as if you had done all procedures)
Pack 216-217 Taring a balance; use of a pipette bulb (read and understand)

Ex. 10 Gram Stain (Q1-5)
Ex. 14 + Use of Differential & Selective Media (Q a-g & Q 1-2)
Pack 263-278 & Identification of Unknown Bacterial Cultures (next lab is deadline for having pure working culture of your unknown)
Ex. 32 + Pack 246-252 & Cultural Characteristics of Microbes [use this information to evaluate "Distribution of Microorganisms in the Environment" & all other observations of microbial growth during semester]
Ex. 3 + Pack 258-259 Dichotomous key practice—begin today (& continue in subsequent weeks)


**IV February 2-4  DETERMINATION OF OXYGEN REQUIREMENT;  METHODS FOR GROWING ANAEROBES;  SPORE STAIN; CONTROL OF MICROBIAL GROWTH—-with ULTRAVIOLET LIGHT;  2 BIOCHEMICAL TESTS**

*****  
DEADLINE: for pure working cultures of your unknown  
pp. 219-220  
Physical & Chemical Agents for the Control of Microbial Growth  
Ex. 17  +  
Physical Factors: Atmospheric Oxygen Requirements  
Ex. 12 Part A  
Staining for Visualization of Cell Structures: A. Spore Stain (Schaeffer-Fulton Method)(Q1-4)  
We will do a modification of this method without heat.  
Ex. 35  +  
Physical agents: Electromagnetic radiations (resistance of spores to UV) (Q2-5)  
Ex. 18  +  
Techniques for the Cultivation of Anaerobic Microorganisms (Q1, 3-5)  
Ex. 29  
Biochem: Catalase Test (Q1-4)  
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Continue or complete ongoing exercises & identification of unknown cultures  
Pack 258-259  
Continue Dichotomous Key practice  
Pack 280-285  
Continue group work on Pathogen Poster & Normal Microbiota  

**V February 9-11  ACID-FAST STAIN; BIOCHEMICAL TESTS—SUGAR FERMENTATIONS; EXTRACELLULAR ENZYMES; REVIEW**

pp. 95-96  
Cultivation of Microorganisms: Nutritional and Physical Requirements  
Ex. 11  
Acid Fast Stain (Ziehl-Neelsen Method) (Q 1-5) --- demonstration slides  
pp. 151-152  
Biochemical Activities  
Ex. 21  +  
Biochem: Extracellular Enzymatic Activities of Microorganisms (Q 1,3)  
Ex. 22  +  
Biochem: Carbohydrate Fermentation [24hr] (Q 1-4)  
Ex. 23  +  
Biochem: Triple Sugar Iron Agar Test **[18-24hr]** (Q1-5)  
Ex. 28  +  
Biochem: Nitrate Reduction Test [24-48 hr](Q1-4)  
Pack 258-259  
Continue Dichotomous Key practice  
Pack 280-285  
Pathogen Poster/Normal Microbiota Project continued  

**IMPORTANT SCHEDULE NOTE:** You will need to return to the lab the next day (ideal) or the day after to read these test results. If reading of the results is delayed, they won’t be accurate. You may come when another lab is in session so long as you don’t disturb the class or interrupt the instruction. For those whose lab is on Thursday, there will be a time on Friday when the lab is open.

**VI February 16-18**

*****  **LABORATORY TEST (closed book)**  
******  **PRACTICAL TESTS: ASEPTIC TECHNIQUE, PLATE STREAKING & FOCUSING OF MICROSCOPE**  
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Continue or complete ongoing exercises & identification of unknown cultures  

**REMINDER:** Lab books may be collected and graded at ANY time during the semester; this could occur once or more than once and may be announced OR unannounced. You should come to class at all times with your lab book(s) organized, complete and up-to-date.
VII February 23-25 BIOCHEMICAL TESTS; MOTILITY (using WET MOUNTS & a SEMI-SOLID AGAR); BIOCHEMICAL I.D. SYSTEMS; CONTROL OF MICROBIAL- GROWTH---ANTISEPTICS & DISINFECTANTS

pp. 151-152 Biochemical Activities (continued)
Ex. 24+ Biochem: IMViC Test  A. Indole;  B. Methyl Red;  C. Voges-Proskauer;  D. Citrate (Q1-6)
Ex. 25 + Biochem: Hydrogen Sulfide Test (Q1-5)
Ex. 5 Microscopic Examination of Living Bacterial Preparations
Ex. 48 Identification of Enteric Microorganisms Using Computer-Assisted Multi-Test Microsystems (demonstration) (Q1-5)

L71-74 Pathogen Poster project continued
Pack 280-285 Continue Dichotomous Key practice
Pack 263-278 Continue or complete ongoing exercises & identification of unknown cultures
------ Continue identification of unknowns  [See hint in next paragraph.]

***Monday February 29—noon Deadline for requesting supplemental media for unknown culture identification.*** You may request new media not previously used, and will be advised whether it can be provided. All requests must be in writing or by e-mail to your instructor using the subject line: Special Media Request. Please explain why this medium is of value for identification of your unknown. For previously used media, you should indicate why it is necessary for you to repeat the test now if you did not repeat a test immediately after first reading the results. It may take 3-4 days to get these media prepared. **HINT:** Request media sooner to permit more time to apply those results.

VIII March 1-3 DILUTIONS & PLATE COUNTS; WATER QUALITY TESTING (MPN)
Ex. 19 & Pack 286-295 + Serial Dilution--Agar Plating Procedure to Quantitate Viable Cells
Pack 289, 302 Dilution problems (Q1-5, 7 ALL in coursepack)
p. 269 Microbiology of water
Ex. 41 + Standard Qualitative Analysis of Water (Q 1-4)
+ A. Presumptive Test: Determination of the Most Probable Number (Demo);  
+ B. Confirmed Test 
+ C. Completed Test
Appendix p. 329 Methods for Preparation of Dilutions
Handout Continue exercise on pathogenic bacteria and normal microbiota
------ Continue or complete ongoing experiments

IX March 8-10 Spring Break-----No Labs

X March 15-17 PROJECT WORK DAY
Pack 263-278 Continue identification of unknown cultures
Pack 258-259 Continue Dichotomous Key practice
Pack 280-285 Continue group work on Pathogen Poster & Normal Microbiota

**Major dishwashing effort;** all contaminated materials that you are finished with should be placed in the discard area.
XI  March 22-24  CONTROL OF MICROBIAL GROWTH---with ANTIBIOTICS, ANTISEPTICS & DISINFECTANTS

pp. 219-220  Physical & Chemical Agents for the Control of Microbial Growth
Ex. 36 +  Chemical Agents: Chemotherapeutic agents—
          Part A. Kirby-Bauer Antimicrobial Sensitivity Test Procedure
          Part B. Synergistic Effect of Drug Combinations
Ex. 38 +  Chemical agents of control: Disinfectants & Antiseptics
Handout  Continue exercise on pathogenic bacteria and normal microbiota
-----  Continue or complete ongoing experiments

MARCH 22-24  DEADLINE FOR SUBMITTING UNKNOWN REPORTS  (submit to your lab instructor during your lab section; 10% penalty for each day late, including each weekend day; reports over 10 days late will not be accepted)

XII  March 29-31  PATHOGEN POSTER PRESENTATIONS; MEDICAL MICROBIOLOGY; NORMAL MICROBIOTA

pp. 303-304  Medical Microbiology-Introduction
Ex. 47  Normal Microbiota of the Throat & Skin (read pages 417-418)
Pack 280-285  Completion of exercise/presentations on normal microbiota and on pathogenic bacteria
-----  Complete ongoing exercises
-----  Start Laboratory Checkout and Cleanup

XIII  April 5-7

*******  **Cumulative LABORATORY TEST #2  (closed book)**

XIV  April 12-14  Food Microbiology

page 259-260  Microbiology of Food
pack 296-301  Microbial Production of Food Products
pack 296  ***Advance Assignment***
          Sign up for the food item on sign-up sheets posted in the lab
Ex. 40  Wine production (read p. 265)

XV  April 19-21  Since Monday classes are meeting on Thursday, April 21, none of our lab sections will meet this week.

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Important Note: If the schedule needs to be shifted because of class cancellation for a weather event, influenza, or other emergency during the term, the date of the lab final may change.
+ indicates exercise for which follow-up will be necessary. In some cases, this can be done during a scheduled laboratory. In other cases, it will be necessary to do this on days other than Tuesday or Wednesday. The time in brackets [ ] indicates the approximate time at which follow-up should be done.

*Pack* course pack laboratory section at end of coursepack (specific pages are changing due to renumbering & will be posted.

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