BIOL 3702L: Microbiology Laboratory

Calendar of Exercises, Skills Tests, and Quizzes

Disclaimer Notice: Serious effort and consideration were used in formulating this laboratory syllabus. While viewed as an educational contract between the course instructor/teaching assistant (TA) and student, unforeseen events may cause changes to the scheduling of exercises, quizzes, etc. Every effort will be made NOT to change scheduled items. Nonetheless, the course instructor and/or TA reserves the right to make any changes deemed necessary to best fulfill the course objectives. Such changes will be announced to students in a timely fashion using reasonable means. This disclaimer does not abrogate any student rights as described by University rules and regulations.

NOTE: The page numbers given below correspond to the published 6th edition of the spiral laboratory manual. Earlier editions or the e-version of the manual may not have the same corresponding page numbers.

WEEK 1

Monday, August 23 and Tuesday, August 24

Laboratory Sections Will Not Meet

Wednesday, August 25 and Thursday, August 26

Class Activity:

◆ Meet your Teaching Assistant (TA)
◆ Orientation to the laboratory
◆ Review:
  ● Rules of Conduct and General Safety, pages xi-xii
  ● Summary of Universal Precautions and Laboratory Safety Procedures, pages xiii-xiv
  ● General Laboratory Procedures - available at the following URL: http://www.as.ysu.edu/~crcooper/LabRules.pdf

[continued on the next page]
Individual Activity:

◆ **Exercise #1**: Bright-Field Light Microscopy and Microscopic Measurement of Organisms, pages 2-12
  - **Perform**: Steps 1-8 of Procedure for Basic Microscopy: Proper Use of the Microscope, pages 3-5
  - **Laboratory Report**: Complete all of page 9 and Question #3 on page 11; Short answer questions on pages 12-14 to be assigned by the TA

**WEEK 2**

*Monday, August 30 and Tuesday, August 31*

**Quiz I**: Laboratory Safety and Procedures

Individual Activity:

◆ **Exercise #6**: Negative Staining, pages 34-38
  - **Perform**: Steps 1-7 of Procedure, pages 35-36
  - **Laboratory Report**: Complete all of page 37; Short answer questions on page 38 to be assigned by the TA

*Wednesday, September 1 and Thursday, September 2*

Individual Activity:

◆ **Exercise #7**: Smear Preparation and Simple Staining, pages 39-44
  - **Perform**: Steps 1-4 of Procedure – Smear Preparation, pages 40-41, and Steps 1-6 of Procedure – Simple Staining, page 41
  - **Laboratory Report**: Complete Question #1 on page 43; Short answer questions on pages 43-44 to be assigned by the TA

**WEEK 3**

*Monday, September 6 and Tuesday, September 7*

Laboratory Sections Will Not Meet
Wednesday, September 8 and Thursday, September 9

Individual Activity:

◆ Exercise #8: Gram Stain, pages 45-52
  ● Laboratory Report: Complete Questions #1 and #2 on page 51; Short answer questions on page 52 to be assigned by the TA

WEEK 4

Monday, September 13 and Tuesday, September 14

Individual Activity:

◆ Exercise #10: Endospore Staining (Schaeffer-Fulton or Wirtz-Conklin), pages 59-64
  ● Perform: Steps 1-8 of Procedure, pages 60-61
  ● Laboratory Report: Complete the appropriate portion(s) of Question #1 on page 63; Short answer questions on pages 63-64 to be assigned by the TA

Wednesday, September 15 and Thursday, September 16

Quiz II: Staining Methods

Complete All Staining Exercises

WEEK 5

Monday, September 20 and Tuesday, September 21

Skills Test I: Gram Stain Unknown (download the instructions for this test at the following URL: http://www.as.ysu.edu/~crcooper/3702ST1.pdf

Individual Activities:

◆ Exercise #14: Culture Transfer Instruments, Techniques, and Isolation and Maintenance of Pure Cultures, pages 85-93
  ● Perform: All Steps of Procedure for Culture Transfer Instruments and Techniques, pages 88-90
  ● Laboratory Report: Complete all of page 91; Short answer questions on pages 92-93 to be assigned by the TA

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◆ **Exercise #16:** The Streak-Plate Technique and Differential Media, pages 101-106  
  ● **Perform:** Steps 5-7 of Procedure on page 102 (tryptic soy agar plates will be provided for you – omit steps 1-4) and steps 5-6 of Procedure on page 104 (media will be provided for you – omit steps 1-4)  
  ● **Laboratory Report:** Questions on pages 105-106 to be assigned by the TA

**Wednesday, September 22 and Thursday, September 23**

**Group Activity:**

◆ **Exercise #19:** Determination of Bacterial Numbers, pages 119-126  
  ● **Perform:** Procedure – Standard Plate Count on page 120  
  ● **Laboratory Report:** Complete Question #1 on page 123; Short answer questions on pages 125-126 to be assigned by the TA

**WEEK 6**

**Monday, September 27 and Tuesday, September 28**

**Skills Test I:** **DUE AT BEGINNING OF LABORATORY!!!**

**Skills Test II:** **Streak Plate** (download the instructions for this test at the following URL: [http://www.as.ysu.edu/~crcooper/3702ST2.pdf](http://www.as.ysu.edu/~crcooper/3702ST2.pdf). **NOTE:** Inoculate plates, then submit to TA for incubation/scoring.

**Group Activities:**

◆ **Exercise #20:** Carbohydrates I: Fermentation and ß-Galactosidase Activity, pages 128-134  
  ● **Perform:** All Steps of Procedure – Durham Tube, page 131  
  ● **Laboratory Report:** Complete Questions #1 and #2 on page 133; Short answer questions on pages 133-134 to be assigned by the TA

◆ **Exercise #21:** Carbohydrates II: Triple Sugar Iron Test, pages 135-140  
  ● **Perform:** Procedure on page 137  
  ● **Laboratory Report:** Complete Question #1 on page 139; Short answer questions on pages 139-140 to be assigned by the TA

◆ **Exercise #24:** Proteins, Amino Acids, and Enzymes I: Hydrogen Sulfide Production and Motility, pages 149-154  
  ● **Perform:** Procedure on page 151  
  ● **Laboratory Report:** Complete Questions #1 and #2 on page 153; Short answer questions on pages 153-154 to be assigned by the TA
Wednesday, September 29 and Thursday, September 30

Group Activity:

◆ **Exercise #28**: Proteins, Amino Acids, and Enzymes V: Catalase Activity, pages 171-174
  - **Perform**: Step 4 of Procedure – Second Period on page 172 should be conducted with cultures to be provided for you
  - **Laboratory Report**: Complete Question #1 on page 173; Short answer questions on pages 173-174 to be assigned by the TA

◆ **Exercise #30**: Proteins, Amino Acids, and Enzymes VII: Oxidase Test, pages 181-186
  - **Perform**: Procedure – Second Period on page 182 (omitting KEY Oxidase Test Strip method) by placing bacteria on slides (as in Exercise 28) using cultures to be provided
  - **Laboratory Report**: Complete Question #1 on page 185; Short answer questions on pages 185-186 to be assigned by the TA

◆ **Exercise #31**: Proteins, Amino Acids, and Enzymes VIII: Ureas Activity, pages 187-192
  - **Perform**: Procedure – First Period on page 188 and Procedure – Second Period (the following day) on page 189
  - **Laboratory Report**: Complete Question #1 on page 191; Short answer questions on pages 191-192 to be assigned by the TA

**WEEK 7**

Monday, October 4 and Tuesday, October 5

Group Activities:

◆ **Exercise #25**: Proteins, Amino Acids, and Enzymes II: The IMViC Tests, pages 155-162
  - **Perform**: All Procedures – Durham Tube, pages 157-160
  - **Laboratory Report**: Complete Questions #1, #2, and #3 on page 161; Short answer questions on pages 161-162 to be assigned by the TA

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◆ **Exercise #32:** Proteins, Amino Acids, and Enzymes IX: Lysine and Ornithine Decarboxylase Test, pages 193-198

- **Perform:** Procedure – First Period (Standard Method) on page 194 and Procedure - Second Period on page 196 (omitting KEY test instructions)
- **Laboratory Report:** Complete Questions #1 and #2 on page 197; Short answer questions on pages 197-198 to be assigned by the TA

◆ **Exercise #33:** Proteins, Amino Acids, and Enzymes X: Phenylalanine Deamination, pages 199-204

- **Perform:** Procedure on page 200 (omit Step 4 – First Period)
- **Laboratory Report:** Complete Question #1 on page 203; Short answer questions on pages 203-204 to be assigned by the TA

◆ **Exercise #34:** Proteins, Amino Acids, and Enzymes XI: Nitrate Reduction, pages 205-210

- **Perform:** Procedure on page 206
- **Laboratory Report:** Complete Question #1 on page 209; Short answer questions on pages 209-210 to be assigned by the TA

*Wednesday, September 29 and Thursday, September 30*

Complete All Portions of Exercises 25 and 32-34

**WEEK 8**

*Monday, October 11 and Tuesday, October 12*

**Quiz III:** Biochemical Diagnostic Tests

**Skills Test III:** Bacterial Unknowns (download the instructions for this test at the following URL: [http://www.as.ysu.edu/~crcooper/3702ST3.pdf](http://www.as.ysu.edu/~crcooper/3702ST3.pdf))

*Wednesday October 13 and Thursday, October 14*

Continue with Skills Test III

**WEEK 9**

*Monday, October 18 and Tuesday, October 19*

Continue with Skills Test III

*Wednesday October 20 and Thursday, October 21*

Complete Skills Test III and Submit Report by End of Laboratory Session
**WEEK 10**

**Monday, October 25 and Tuesday, October 26**

**Group Activity:**
- **Exercise #46:** Standard Coliform Most Probable Number (MPN) Test and Presence-Absence Coliform Test, pages 289-294
  - **Materials Needed:** Each group should bring at least 125 ml of a water sample (room temperature) from a possible contaminated water system [see page 289]
  - **Perform:** All Procedures, page 292
  - **Laboratory Report:** Record your results as indicated on page 293. Although the experiment will be conducted as a group activity, individuals will write and submit a draft and final laboratory report by the dates stated in the laboratory report instructions which can be downloaded from the following URL: [http://www.as.ysu.edu/~crcooper/LabReport(F04).pdf](http://www.as.ysu.edu/~crcooper/LabReport(F04).pdf)

**Wednesday October 27 and Thursday, October 28**

Continue with Exercise 46

**WEEK 11**

**Monday, November 1 and Tuesday, November 2**

Continue with Exercise 46

**Wednesday, November 3 and Thursday, November 4**

Continue with Exercise 46

Draft of Laboratory Report Due

**WEEK 12**

**Monday, November 8 and Tuesday, November 9**

Draft Reports Returned and Reviewed During Laboratory Session

**Wednesday, November 10 and Thursday, November 11**

Laboratory Sections Will Not Meet

**Note:** Use This Time to Complete Your Final Draft of the Laboratory Report
**WEEK 13**

**Monday, November 15 and Tuesday, November 16**

Laboratory Report: **DUE AT BEGINNING OF LABORATORY!!!** Also, be sure to have submitted it to Turnitin.com.

**Group Activities:**

◆ **Exercise #40: pH, pages 247-250**
  - **Perform:** Procedure – First Period and Steps 3-4 of Procedure – Second Period on page 248
  - **Laboratory Report:** Complete all questions on page 249; Short answer questions on page 250 to be assigned by the TA

◆ **Exercise #41: Osmotic Pressure, pages 251-254**
  - **Perform:** Procedure on page 252
  - **Laboratory Report:** Complete all questions on page 253; Short answer questions on page 254 to be assigned by the TA

◆ **Exercise #42: The Effects of Chemical Agents on Bacteria I: Disinfectants, pages 255-260**
  - **Perform:** Procedure – First Period, Growth Inhibition and Procedure – Second Period, Growth Inhibition on pages 256-257
  - **Laboratory Report:** Complete Question #1 and #2 on page 259; Short answer questions on page 260 to be assigned by the TA

◆ **Exercise #43: The Effects of Chemical Agents on Bacteria II: Antimicrobial Agents (Kirby-Bauer Method), pages 261-266**
  - **Perform:** Procedure on page 262
  - **Laboratory Report:** Complete all questions on page 265; Short answer questions on page 266 to be assigned by the TA

**Wednesday, November 17 and Thursday, November 18**

Complete All Portions of Exercises 40-43

**WEEK 14**

**Monday, November 22 and Tuesday, November 23**

**Quiz IV: Exercises 40-43**

**Wednesday, November 24 and Thursday, November 25**

Laboratory Sections Will Not Meet
**WEEK 15**

*Monday, November 29 and Tuesday, November 30*

Review Session – Attendance Optional

*Wednesday, December 1 and Thursday, November 4*

Laboratory Examination