Lab: Dates: Exercises:

Week 1
1 08/28-08/29  Drop/Add, Syllabus, Grading and Attendance Policies
   Orientation: Laboratory Operation and Procedures and Laboratory Safety Rules
2 08/30-08/31 TOPICS: Handling Microorganisms Safely
   Begin:
   Ex. 1 = Principles of Aseptic Technique (p. 3)
   Ex. 2 = Aseptic Method for Entering Culture Tubes and Transferring Cells (p. 5)
   Ex. 12 = Sterilization Principles and Methods (p. 99)

Week 2
09/04-09/05 NO LABS (Labor Day Holiday)
3 09/06-09/07 TOPICS: Introduction to Microscopy, Cell Morphology and Staining Microorganisms
   Begin:
   Ex. 3 = Principles and Care of the Light Microscope (p. 13)
   Ex. 4 = Introduction to Staining Microorganisms (p. 21)
   Ex. 5 = Smear Preparation, Fixation, and Simple Staining with Basic Dyes (p. 27)
   Ex. 6 = Observing Live Microorganisms: The Wet-Mount Method and the Phase-Contrast Microscope (p. 35) - Demonstration
   Ex. 13 = Preparing Culture Media (p. 107)
   Continue:
   Ex. 2 = Aseptic Method for Entering Culture Tubes and Transferring Cells (p. 5)

Week 3
4 09/11-09/12 TOPICS: Differential Staining
   Begin:
   Ex. 7A = The Gram Stain: A Differential Stain
   Ex. 13 = Preparing Culture Media (p. 107)
5 09/13-09/14 TOPICS: Structural Staining and Motility
   Begin:
   Ex. 9A = Bacterial Endospores: Observing Endospores with a Phase-Contrast Microscope –(Demo)
   Ex. 9B = Bacterial Endospores: Observing Endospores with Simple Stains and the Gram Stain
   Ex. 9C = Bacterial Endospores: Structural Staining of Endospores with Hot Malachite Green
   Ex. 10A= Bacterial Flagella –Liefson’s Flagella Stain- (Demo)
   Ex. 10B= Bacterial Flagella and Motility: Observing Motility with the Phase Contrast Microscope-(Demo)
   Ex. 10C= Observing the consequence of motility on plates and in soft-agar deeps

Week 4
6 09/18-09/19 TOPICS: Culturing Bacteria and Determining Culture Purity
   Begin:
   Ex. 14 = Separating Microbes on Streak Plates (p. 119)
   Ex. 16 = Agar-Slant and Agar-Deep Cultures (p. 143)
   Ex. 17 = Broth Cultures (p. 151) (** 24 hr. observations)
   Continue:
   Ex. 10C= Observing the consequence of motility on plates and in soft-agar deeps

** Special Note: ** Ex. 17 and Ex. 35 require that some of the results be recorded after 24 hours. This means that all students will have to come to the incubator (CON 336) for a brief period of time on the day after they start each exercise (i.e. on a day they do not normally have lab) to take these observations. Additional information will be provided by the instructors during the regular lab periods.
Week 5

7  09/20-09/21  **TOPICS:** Determining Culture Purity
**Begin:**
Ex. 15A = Determining Culture Purity: Testing the Purity of a Colony
**Continue:**
Ex. 14 = Separating Microbes on Streak Plates (p. 119)
Ex. 16 = Agar-Slant and Agar-Deep Cultures (p. 143)
Ex. 17 = Broth Cultures (p. 151)

8  09/25-09/26  **TOPICS:** Growth & Enumeration
**Begin:**
Ex. 20 = Counting Viable Cells: Serial Dilution and Spread Plates (p. 175)
Ex. 7B = Gram stain of an unknown microorganism.
**Continue:**
Ex. 14 = Separating Microbes on Streak Plates (p. 119)
Ex. 15A = Determining Culture Purity: Testing the Purity of a Colony

Week 6

9  09/27-09/28  **TOPICS:** Selective Culturing and **QUIZ #1 (Labs 1-6)**
**Begin:**
Ex. 21 = Selective and Differential Media (p. 195)
Ex. 22 = Enrichment Techniques
Ex. 51 = Solid Food Preservation: Sauerkraut (p. 463)
**Continue:**
Ex. 20 = Counting Viable Cells: Serial Dilution and Spread Plates

10  10/02-10/03  **TOPICS:** Environmental Effects on Growth and **REPORT #1 Due (Ex. 7A and B)**
**Begin:**
Ex. 23 = The Effects of Temperature on Growth (p. 213)
Ex. 24 = The Effects of Elevated Sugar and Sodium Chloride Concentrations on Growth (p. 219)
Ex. 25 = The Effects of Free-Oxygen Concentration on Growth: Agar-Deep Cultures (p. 225)
Ex. 18 = Culturing Anaerobes: Thioglycolate Use and the Anaerobe Jar.
**Continue:**
Ex. 21 = Selective and Differential Media (p. 195)
Ex. 51 = Solid Food Preservation: Sauerkraut (p. 463)

11  10/04-10/05  **TOPICS:** Viruses and Molecular Biology
**Begin:**
Ex. 37 = Enumeration of Lytic Viruses: The Plaque Assay (p. 315)
Ex. 39A = Effects of Ultraviolet Light on DNA, Cell Viability, and Mutation Frequency (p. 333)
**Continue:**
Ex. 23 = The Effects of Temperature on Growth (p. 213)
Ex. 24 = The Effects of Elevated Sugar and Sodium Chloride Concentrations on Growth (p. 219)
Ex. 25 = The Effects of Free-Oxygen Concentration on Growth: Agar-Deep Cultures
Ex. 18 = Culturing Anaerobes: Thioglycolate Use and the Anaerobe Jar (p. 159)
Ex. 51 = Solid Food Preservation: Sauerkraut (p. 463)

Week 7

12  10/09-10/10  **TOPICS:** Nutrient Degradation and Transport
**Begin:**
Ex. 26 = Introduction to Extracellular Degradation (p. 235)
Ex. 27 = Microbial Degradation of Polysaccharides Starch (p. 241)
Ex. 28 = Microbial Degradation of Proteins Casein and Gelatin (p. 241)
Ex. 29 = Microbial Degradation of Lipids (p. 257)
**Continue:**
Ex. 37 = Enumeration of Lytic Viruses: The Plaque Assay
Ex. 39A = Effects of Ultraviolet Light on DNA, Cell Viability, and Mutation Frequency
Ex. 51 = Solid Food Preservation: Sauerkraut (p. 463)
Lab: Dates: Exercises:

13 10/11-10/12 TOPICS: Metabolic Products
   Begin:
   Ex. 30 = Differential Utilization of Citrate by the Enteric Bacteria
   Ex. 31 = Acid and Gas Production from Sugar Fermentation (p. 269)
   Ex. 32 = Acid and Neutral Products from Sugar Fermentation: The Methyl Red and Voges-Proskauer Tests
   Ex. 34 = Indole Production from the Amino Acid Tryptophan and Catabolite Repression (p.291)
   Continue:
   Ex. 27 = Microbial Degradation of Polysaccharides Starch (p. 241)
   Ex. 28 = Microbial Degradation of Proteins Casein and Gelatin (p. 241)
   Ex. 29 = Microbial Degradation of Lipids (p. 257)

Week 8
14 10/16-10/17 TOPICS: Metabolic Products & LAB REPORT # 2
   Begin:
   Ex. 36 = Test for Cytochrome C (Oxidase) and Catalase Activities (p.303)
   Ex.15B= Determining Culture Purity: Separating Cultures from an Unknown Mixture (p.131)
   Ex. 33 = Microbial H2S Production from Thiosulfate and Sulfur-Containing Amino Acids (p285)
   Ex. 35 = Products Formed in Milk: The Litmus Milk Test (p.297) (**24 hr. observations)
   Continue:
   Ex. 28 = Microbial Degradation of Proteins Casein and Gelatin
   Ex. 30 = Differential Utilization of Citrate by the Enteric Bacteria
   Ex. 31 = Acid and Gas Production from Sugar Fermentation
   Ex. 32 = Acid and Neutral Products from Sugar Fermentation: The MR and VP Tests
   Ex. 34 = Indole Production from the Amino Acid Tryptophan and Catabolite Repression
   Ex. 51 = Solid Food Preservation: Sauerkraut (p. 463)

15 10/18-10/19 TOPICS: Medical Microbiology and Immunology & QUIZ #2 (Labs 7 - 13)
   Begin:
   Ex. 8    = The Acid-Fast Stain: A Differential Stain
   SE #1   = Transmission of Microbes on Human Skin and Fomites
   Ex. 45  = Coagulase Production by Pathogenic Staphylococci (p. 413)
   Ex. 46  = Hemolysis of Red Blood Cells (p. 421)
   Continue:
   Ex.15B= Determining Culture Purity: Separating Cultures from an Unknown Mixture (p.131)
   Ex. 33 = Microbial H2S Production from Thiosulfate and Sulfur-Containing Amino Acids
   Ex. 35 = Products Formed in Milk: The Litmus Milk Test (p.297)

Week 9
16 10/23-10/24 TOPICS: Medical Microbiology and Immunology
   Begin:
   Ex. 47 = Bacteria on Human Skin (p. 431)
   Ex. 48 = Bacteria in the Human Throat (p. 441)
   SE #2 = Bacteria in Human Urine
   Continue:
   SE #1 = Transmission of Microbes on Human Skin and Fomites - Supplemental Exercise
   Ex. 46 = Hemolysis of Red Blood Cells (p. 421)
   Ex. 35 = Products Formed in Milk: The Litmus Milk Test (p.297)
   Ex. 51 = Solid Food Preservation: Sauerkraut (p. 463)

17 10/25-10/26 TOPICS: Medical Microbiology and Immunology
   Begin:
   Ex. 43 = Evaluating the Effectiveness of Common Antiseptics and Disinfectants (p. 397)
   Ex. 44 = Antibiotic Evaluation by the Kirby-Bauer Method (p.405)
   Continue:
   Ex. 51 = Solid Food Preservation: Sauerkraut (p. 463)
   Ex. 47 = Bacteria on Human Skin (p. 431)
   Ex. 48 = Bacteria in the Human Throat (p. 441)
   SE #2 = Bacteria in Human Urine
Week 10
18 10/30-10/31 TOPICS: Environmental Microbiology

Begin:
Ex. 53 = Detecting Coliform Bacteria in Water (p. 479)
Ex. 54 = Introduction to the Nitrogen Cycle (p. 487)
Ex. 55 = Nitrogen Fixation -- Reduction of Dinitrogen to Ammonia by Prokaryotes (p. 493)

Continue:
Ex. 43 = Evaluating the Effectiveness of Common Antiseptics and Disinfectants (p. 397)
Ex. 44 = Antibiotic Evaluation by the Kirby-Bauer Method (p. 405)
Ex. 22 = Enrichment Techniques (p. 203)

Week 11
19 11/01-11/02 TOPICS: Environmental Microbiology & QUIZ #3 (Labs 14 – 17)

Begin:
Ex. 56 = Ammonification -- Microbial Deamination of Nitrogenous Organic Compounds (p499)
Ex. 57 = Denitrification -- Complete Reduction of Nitrate and Nitrite to Dinitrogen (p. 507)
SE #3 = Enumeration of Microorganisms in Soil Samples

Continue:
Ex. 53 = Detecting Coliform Bacteria in Water
Ex. 51 = Solid Food Preservation: Sauerkraut

Week 12
20 11/06-11/07 TOPICS: Environmental Microbiology & LAB REPORT #3

Continue:
Ex. 51 = Solid Food Preservation: Sauerkraut (p. 463)
Ex. 53 = Detecting Coliform Bacteria in Water
Ex. 56 = Ammonification -- Microbial Deamination of Nitrogenous Organic Compounds
Ex. 57 = Denitrification -- Complete Reduction of Nitrate and Nitrite to Dinitrogen
Ex. 22 = Enrichment Techniques (p. 203)
SE #3 = Enumeration of Microorganisms in Soil Samples

Week 13
21 11/08-11/09 TOPICS: Food Microbiology

Begin:
Ex. 50 = Milk Preservation: Yogurt (p. 455)
Ex. 52 = Numbers of Bacteria on Solid Foods (p. 469)

Continue:
Ex. 51 = Solid Food Preservation: Sauerkraut (p. 463)

Week 14
22 11/13-11/14 TOPICS: Molecular Techniques and QUIZ # 4 (Labs 18 – 21)

Begin:
Ex. 58 = Identification of Unknown Microorganisms (p. 515)
SE #4 = DNA Fingerprinting and Phylogenetic Analysis of Bacteria

Continue:
Ex. 50 = Milk Preservation: Yogurt (p. 455)
Ex. 52 = Numbers of Bacteria on Solid Foods (p. 469)

Week 15
23 11/15-11/16 TOPICS: Molecular Techniques and LAB REPORT #4

Continue:
SE #4 = DNA Fingerprinting and Phylogenetic Analysis of Bacteria
Ex. 58 = Identification of Unknown Microorganisms (p. 515)

Week 16
24 11/20-11/21 TOPICS: Molecular Techniques

Continue:
SE #4 = DNA Fingerprinting and Phylogenetic Analysis of Bacteria
Ex. 58 = Identification of Unknown Microorganisms (p. 515)

11/22-11/23 NO LABS (Thanksgiving Day Holiday)
Lab:  Dates:  Exercises:

Week 14
25  11/27-11/28  
   **Continue:**  
   Ex. 58 = Identification of Unknown Microorganisms (p. 515)

26  11/29-11/30  **TOPICS:** Molecular Techniques  
   **Begin:**  
   SE #5 = Transformation of Bacteria with Plasmid pGLO  
   **Continue:**  
   Ex. 58 = Identification of Unknown Microorganisms (p. 515)

Week 15
27  12/04-12/05  **TOPICS:** Molecular Techniques  
   **Continue:**  
   SE #5 = Transformation of Bacteria with Plasmid pGLO  
   Ex. 58 = Identification of Unknown Microorganisms (p. 515)

28  12/06-12/07 **FINAL EXAMINATION (LAB PRACTICUM EXAM) & QUIZ #5 (Labs 22-26)**  
Completed lab manuals due at end of class period.  
**Written report on identification of unknown due by 5 PM on 12/08/2006**